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INSTRUMENTATION

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PREFACE.

THE paucity of books in our language on the subject of Instrumentation has always appeared to the present writer a matter of surprise. On the Continent many excellent treatises have been published, such as those of Berlioz and Gevaert in French, and of Lobe and Marx in German; but with the exception of the translations of Berlioz, and of Czerny's "School of Practical Composition" (the third volume of which treats, it must be confessed rather superficially, of orchestration), we have scarcely anything in English beyond such elementary details as may be found in Musical Catechisms. The present Primer is an imperfect attempt to supply the deficiency.

In writing this book the author has more than once had occasion to remark that under no circumstances can Instrumentation be taught from an instruction-book; and in completing his work he feels this even more keenly than in commencing it. It is by no means with unqualified satisfaction that he looks at the result of his labours. The subject is so rich in details, and there is so much that ought to be said which it has been impossible to say within the limits of a primer, that the author feels that many parts of his subject (especially those discussed in Chapters VI, VII, and VIII) have been dealt with in a manner so summary as to be inadequate to their importance. Want of space must be the excuse—it is hoped not altogether an insufficient one.

An apology appears needful for the very fragmentary nature of the quotations given from the scores of the great masters. In many cases these do not exceed three or four bars; it would have been impossible to render them more complete without greatly enlarging the size of the work. Fortunately so many cheap editions of full scores have recently been published, that

students will be able, without any very considerable outlay, to obtain them for themselves. For this reason, the best known and most easily procurable scores of Mozart, Haydn, and Beethoven, have been in many cases merely referred to, instead of quoted.

In the selection of illustrative passages the author has been guided by the desire to render his work useful, as far as possible, to those who might have in their libraries other treatises on Instrumentation. He has therefore endeavoured to avoid quoting extracts already given by Berlioz and other authors; and he has in every instance selected examples from scores in his own library, and not from other instruction-books, for the purposes of illustration. It has always appeared to him a curious thing that although Mendelssohn is, from the purity and fine taste displayed in his instrumentation, one of the best possible models for the young composer, hardly any of the treatises previously published contain so much as one illustration taken from his works. His scores have therefore been somewhat freely drawn upon for the present volume. The author's general plan has been to quote from works less accessible to the student, rather than from those which he could easily procure for himself.

It would be dishonest not to acknowledge the many valuable hints which the author has obtained from the treatises of Gevaert and Lobe—two of the best works on Instrumentation ever written. Those who have a knowledge of the French and German languages are strongly advised to consult these books for themselves. They will find there much useful information conveyed in a singularly clear and interesting form.

In spite of the care which has been expended on the present book, the author dares not flatter himself that no important inaccuracies or omissions will be found in it. It is indeed almost inevitable that, in a work containing such a multiplicity of details, errors will creep in.

EBENEZER PROUT.

TABLE OF CONTENTS

N.B.—The numbers refer to the paragraphs.

PAGE

PREFACE 3

CHAPTER I.—INTRODUCTORY 9

Amount of knowledge presupposed in student, 1—Special requisites: quickness of ear, 2—imagination, 3—Score-reading, 4—Practical knowledge, 7.

CHAPTER II.—THE STRINGED ORCHESTRA 13

Bow instruments, 9—Importance of the strings in the orchestra, 10. *The Violin:* Compass, &c., 12—Scale passages, 13—Double string, 14—Chords, 15, 16—Arpeggios, 17—Tremolo, 18—Phrasing, 19—Sordini, 20—Harmonics, 21—Pizzicato, 22. *The Viola:* Compass, &c., 24, 25—Quality of tone, 26—Employment, 27. *The Violoncello*, 28—Fingering, &c., 29, 30—Methods of treatment, 31-35. *The Double Bass*, 36—Three-stringed, 37—Four-stringed, 38—Various tunings, 39—Specialties of the instrument, 40-42—Strings in combination, 43, 44—Unison passages, 45—The pizzicato, 46—Sordini, 47—Division of parts, 48, 49—A solo violin with the orchestra, 50.

CHAPTER III.—STRINGS, OBOES, BASSOONS, AND HORNS 39

Composition of the modern orchestra, 52 (*note*)—Ancient and modern scores compared, 53—Use of wind instruments, 54. *The Oboe:* Compass, 55—Easy and difficult passages, 56—The *genius* of different instruments; special character of the oboe, 57—Necessity for rests, 58. *The Bassoon*, 59—Fingering, &c., 60—Tone and capabilities, 61—Grotesque effects, 62. *The Horn*, 64—Natural notes, 65—Crooks, 66-68—Notation, 69—Compass, 70—First and second horn parts, 71—Closed notes, 72—Changes of key, 74—Four horns, 75—The best keys for the horn, 76—The Valve-Horn, 77-79—Characteristics of the horn, 80—Combination with bassoons, 82—Employment of horns, 83—Examples of strings and wind combined, 84-87.

PAGE

CHAPTER IV.—STRINGS, WOOD, AND HORNS 57

The Flute, 89—Fingering; shakes, 90—Quality, 91—Agility; "double-tongueing," 92—The Third Flute, 94-96. *The Piccolo*, 97—Its employment, 99. *The Clarinet*, 101—Various kinds of clarinets, 102—Notation, 103, 104—Differences in quality, 105—Tone, 107—Capabilities, 108—The "small orchestra," 109—Examples of its use, 110-115.

CHAPTER V.—THE FULL ORCHESTRA 76

Brass and Percussion Instruments, 116—Use of the brass, 117. *The Trumpet:* Its natural scale, 119—Keys and crooks, 120—High notes in Bach and Handel, 123—Choice of keys for trumpet, 124—Tone, 125—Three trumpets, 126—The Valve-Trumpet, 127. *The Kettle-Drums*, 129—Notation, 130—The Roll, 131—Employment, 132—Tuning, 133—Solo passages, 134—Three drums, 137—Illustrations, 139. *The Trombone*, 140—The slide, 141—Varieties of the trombone, 142—The Alto Trombone, 143—The Tenor Trombone, 144—The Bass Trombone, 145—Notation of the trombones, 147—Tone and employment, 148—Solo passages, 150. *The Ophicleide*, 152—Its tone, 153. *The Bass-Tuba*, 154—Low notes, 155—The bass Drum and Cymbals, 157—The Triangle, 158—Peculiar employment of cymbals by Wagner, 159—Caution against abuse of percussion instruments, 160—Example of a passage for full orchestra, *piano*, 161.

CHAPTER VI.—LESS FREQUENTLY USED INSTRUMENTS 98

The Harp, 163—Its employment in the orchestra, 164. *The Guitar* and *Mandoline*, 165. The Flute and Piccolo in D flat, 166. *The Cor Anglais*, 167. *The Basset-Horn*, 168. *The Bass Clarinet*, 169. *The Serpent*, 170. *The Double Bassoon*, 171. *The Cornet-à-Pistons*, 172. Other brass and percussion instruments, 174. *The Organ*, 175. The use of the instruments mentioned in this chapter should be exceptional, 176.

CHAPTER VII.—ON BALANCE OF TONE: CONTRAST AND COLOUR .. 106

Mistakes of beginners in Instrumentation, 178—The position of the parts, 179—Illustrations of balance of tone, 180, 181—The middle parts not to be too thin, 182—Exceptions, 183—Illustration: different scorings of a common chord, 184, 185—Contrast, 186—Examples analysed, 187-190—Orchestral colouring, 191.

CHAPTER VIII.—THE INSTRUMENTATION OF VOCAL MUSIC 115

Relative importance of voices and orchestra, 192, 193—Exceptions to general principle, 194—Clearness and contrast, 195—Strings form the best groundwork for accompaniment, 196—Example, 197—The voice accompanied by pizzicato, 198—Duet for a voice and instrumental part, 199—Relative positions of voice and accompaniment, 200—Wind instruments as an accompaniment to the voice, 201-203—The accompaniment of recitative, 205—The harp, 206—The instrumentation of choruses, 207—Breadth of effect, 208—The strict style, 209—Unaccompanied voices, 210—The organ in choruses, 211-213—The harmonium, 214—Example for chorus and full orchestra, 215.

PAGE

CHAPTER IX.—THE ORCHESTRATION OF CONCERTOS, AND OTHER INSTRUMENTAL SOLOS 128

General principles, 216—Treatment of the solo instrument, 217—Concertos for one or more instruments; the piano, 218—Examples, 219—Violin concertos, 220—Concertos for wind instruments, 221.

CHAPTER X.—GENERAL PRINCIPLES: CONCLUSION 134

Writing practically; avoidance of undue difficulties, 224—Interesting the performers, 225—Clearness, 226—Each group of instruments to make correct harmony, 227—Noise, 228—The use of ventil instruments, 229—Writing for a small orchestra, 230—Gevaert on the ancient and modern school of Instrumentation, 231—The best models for study, 232—Conclusion, 233.

APPENDIX.—THE ORDER OF THE INSTRUMENTS IN A SCORE .. 139

INDEX OF ILLUSTRATIONS 143

INSTRUMENTATION.

CHAPTER I.

INTRODUCTORY.

1. As the study of Instrumentation may be regarded as one of the highest branches of musical art, a considerable amount of knowledge on the part of the student will be presupposed throughout this book. No one can hope to write for an orchestra with any chance of success who has not obtained a thorough mastery of harmony and composition. He ought to be able to write with ease and correctness in four, five, and even more distinct parts; further than this, if he wishes to attempt the higher class of instrumental works (or of vocal works with orchestral accompaniments) he ought to have counterpoint, single and double, canon and fugue, so to speak, at his fingers' ends. If the height of his ambition is to score a polka, a waltz, or a march, for orchestra, he may indeed dispense with these last-named acquirements; but if he would write a symphony, an overture, a cantata, or an oratorio, he may be well assured that without mastery of the *technique* of his art the most brilliant orchestration will not save his work.

2. Assuming then that the student comes to the study of Instrumentation with the requisite preliminary training in theoretical subjects, there are certain special qualifications which he must acquire (if he have not already done so) before proceeding to write for the orchestra himself. Foremost among these is *quickness of ear.* By this is meant the power of recognising the tone of every instrument in the orchestra, whether heard singly or in combination. When he hears a melody in the orchestra, he ought to be able to tell at once by what instrument or combination of instruments it is being played. This, it should be added, is not always entirely possible; because the parts are frequently doubled without anything being perceptibly added to the general effect. If, for instance, in a large

orchestra the violins are playing *fortissimo*, and one flute is playing in unison with them, the probability is that the latter instrument would not be heard at all, and that the quickest ear would detect no difference if the player stopped. In a *piano* passage the difference would be audible at once. Such cases as this are, however, comparatively rare; and the student should practice himself in picking out the various tones from the tangled web of sound which the modern symphony will present to his ear.

3. Closely connected with the power just named is another, no less indispensable—that imaginative faculty which enables the musician to hear at will in his mind's ear the tone of any instrument or combination of instruments. When, by listening to orchestral performances, he has become thoroughly familiar with the tone of each instrument, he will find it a useful exercise to imagine for himself a simple melody (such, for example, as the first line of "God save the Queen") played on the various instruments, first singly, and then in various combinations—*e.g.*, violin and flute in unison, violin with flute the octave above, oboe and clarinet in unison, oboe and flute in octaves, clarinet and bassoon in octaves—and so on *ad infinitum*. He may then try to hear a four-part common chord in various qualities—for strings alone, strings doubled by oboes and bassoons, clarinets and bassoons alone, &c., &c. These and similar exercises may at first appear difficult; but if the student has a natural aptitude for orchestration, and sufficient perseverance, the difficulty will vanish.

4. Another most necessary qualification for the learner is the power of reading from score. Without this absolutely nothing can be done. For the sake of those who have not made this branch of their art a special study, a few words as to the easiest method of acquiring it may not be out of place. It may be presumed that a quartett or quintett score offers no difficulty; but should such be the case, the study should begin with some of Haydn's quartetts, followed by Mozart's string quintetts, and then by the more elaborate quartetts of Beethoven and Mendelssohn. With orchestral music, it will be best to commence with Haydn's symphonies, because in these the string quartett is generally the most important part; and the student will accustom himself to seeing at a glance where the wind instruments merely double the strings, and where they have independent parts. Haydn's "Creation," may be recommended as the next step, and then, if possible, the operas of Gluck, which are not only most instructive, but comparatively very easy to read. The scores of Mozart should come next in order; then those of Beethoven. The more modern composers—Weber, Mendelssohn, Meyerbeer, &c., should not be studied until later, because of

their greater complexity: probably the most difficult scores in existence to read are those of Berlioz and Wagner.*

5. Before proceeding further, it will be well to say as clearly as possible that Instrumentation can under no circumstances be thoroughly learnt from an instruction-book alone. The combinations of the orchestra are absolutely exhaustless; fresh effects are constantly being discovered, and there are many points which can only be found out by actual experience. Many things which look well on paper sound very ineffective when submitted to the test of actual performance; while, on the other hand, many passages sound in the orchestra much better than they look in the score. It is only possible in a work of this kind to teach general principles, as exemplified in the works of the great masters; to which will be added such practical hints as it is hoped may be found useful.

6. Let us suppose that the student has acquired the power of score-reading, but (as is not improbable) has only an imperfect conception of the actual effect of the combinations which his eye takes in; the next thing is to acquire the imaginative power spoken of above. For this object the method suggested by J. C. Lobe, in the second volume of his "Composition," may be strongly recommended. Let the student take the score of some work which he has a reasonable prospect of hearing played (for instance, one of Beethoven's symphonies, or Haydn's "Creation") and study it carefully, especially trying to realise in his mind the effect of the various combinations; then let him take the score with him to performance, and follow it closely, comparing what he had imagined with what he hears, and thus verifying or correcting his previous impressions; lastly, let him after the performance, while the recollection is still fresh, read the score again, to fix in his memory what he has heard. One of the greatest masters of instrumentation that has ever lived, Hector Berlioz, has said that it was in this way he learned to write for the orchestra; and the author of the present book can add his own testimony to the complete success of the method, if conscientiously carried out.

7. There are still two more hints to be given to the student. It is most desirable that, if possible, he should have at least a slight practical acquaintance with orchestral instruments, especially with the strings. Violin-players often complain that modern composers write "pianoforte passages" for them. They

---

* It will be well to inform students that editions of the most important full scores of Haydn, Mozart, Beethoven, Schubert, Weber, and Mendelssohn, have recently been published at extremely low prices by Peters, of Leipzig. It is therefore now possible even for those of small means to obtain a sufficient number of scores for the purposes of study.

are played, it is true; but they are mostly ineffective; and even a little knowledge of the violin will be of the greatest assistance to the composer in orchestral writing. So also with the wind instruments. If the student can play nothing more than a scale on the flute, oboe, clarinet, or bassoon, it will be an advantage; while some acquaintance with the theory, if not with the practice, of the brass instruments will often save him from writing ineffectively for that important part of the orchestra. Again, let him cultivate, as far as possible, the acquaintance of orchestral players. These gentlemen are mostly very willing to give information with regard to their instruments, and many valuable details may be learned in this way, which are not to be met with in ordinary instruction-books.

8. A few words must be added on the system adopted in the present book. Instead of commencing with a catalogue of all the instruments used in the modern orchestra, and probably confusing the student's mind by the multiplicity of details involved, it has been thought better to begin with an orchestra of strings alone, and to teach first how they are to be used. The various wind instruments are then added by degrees to the strings, until at length the full orchestra is reached. The subjects of balance of tone and contrast will then be treated; next the instrumentation of vocal music, and of concertos, and other instrumental solos; and a few general principles will conclude the volume.

CHAPTER II.

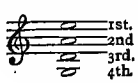
THE STRINGED ORCHESTRA.

9. ALTHOUGH the term "stringed instrument" may properly be applied to such instruments as the harp, the guitar, and the pianoforte, it is always understood that by the "strings" of an orchestra are meant merely the instruments played with a bow. Those in ordinary use in our modern orchestras are the violin, the viola, the violoncello, and the double-bass. Many other varieties of these instruments, which were formerly known under the general name of "viols," are to be found in the works of the old masters. Bach, for instance, employs the *violino piccolo*, the *viola d' amore*, the *viola da gamba*, and the *violoncello piccolo*, none of which instruments are now in use, though Meyerbeer in the first act of "Les Huguenots," has written an *obbligato* for a viola d' amore which, it may be added, is more often than not played upon an ordinary viola. The four kinds of instruments named above are the only ones with which the student will need to be acquainted.

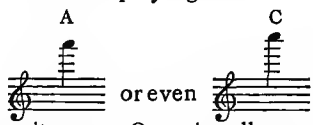
10. A thorough knowledge of the capabilities of the strings is one of the very first requisites for writing for the orchestra. For many reasons the most important share of the work is always allotted to them. The tone of the wind instruments palls upon the ear much sooner than that of the strings. Again, in writing for the latter it is not needful to allow rests for taking breath—an important consideration with the wind. Practically, string-players can continue uninterruptedly for any reasonable time without fatigue. The quality of the strings blends well with every other instrument or with voices; rapid passages, if judiciously written, can be played with very little difficulty; and finally, it is far easier to get very delicate *pianissimo* effects from the strings than from the wind. These are some of the numerous reasons which have influenced the greatest composers in treating this section of the orchestra as the foundation of the whole instrumental structure.

11. Before speaking of the various combinations to be obtained from strings alone, it will be needful to explain the compass of the various instruments, and the peculiar features which each presents.

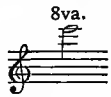
12. I. THE VIOLIN.—This instrument has four strings, tuned in fifths:—



Its compass for orchestral playing is from the open G of the fourth string to—

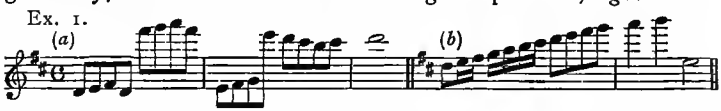


including all the semitones. Occasionally even higher notes are written for the violin; for example, at the end of the Notturno in the "Midsummer Night's Dream," Mendelssohn has written—



The cases, however, in which such extreme notes should be introduced are rare; and for ordinary purposes it will be safer not to go beyond A or at most B. Even with these notes the student will do well to remember that they are best approached gradually, and not with a sudden change of position, *e.g.*:—

Ex. 1.

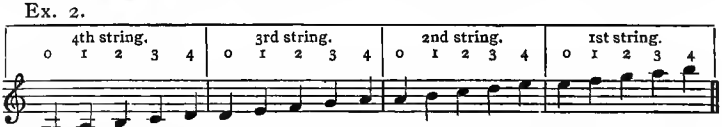


Here the passage (*a*) would be so difficult, owing to the sudden change in the position of the player's hand, that its correct intonation in the orchestra would be almost impossible. On the other hand (*b*) would give not the slightest trouble, because scale passages are perfectly safe. The skip of a twelfth at the close would also be quite easy, because E is the open note on the first string; and even if another note, such as D or F, were substituted, there would still be no danger, because it could be played in the first position.*

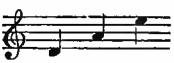
---

* The first position is that in which the hand is placed on the finger-board, close to the nut, so that the fingers stop the strings in such a way as to sound on each string the four notes of the scale leading up to the note sounded by the next open string above:—

Ex. 2.



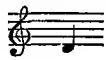
Here 0 indicates the open string (*i.e.*, not pressed by the finger), and 1, 2, 3, 4 show the fingering of the scale in the first position. It will be seen that the notes—



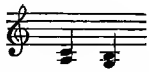
can be played in two ways, either as open or stopped notes; a point which it will be needful to remember hereafter.

13. All kinds of scale passages are practicable on the violin; but chromatic scales are much more difficult than diatonic. They are sometimes written in rapid passages (for example, in Rossini's overture to "Guillaume Tell"), but they should be sparingly used in this way, less because of their difficulty than of their comparative ineffectiveness.

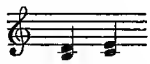
14. Double notes can, with some exceptions, be played on the violin; there are, however, some combinations which are impossible, and others which are difficult. Of the former may be named (1) all double notes below—



Thus—

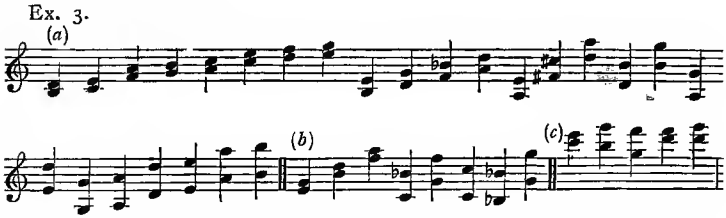


would be quite impracticable, because both notes can only be played on the fourth string; while—



would be perfectly easy, as will be seen by referring to the scale fingering given in Ex. 2. Provided that both notes are not on the fourth string only, all seconds, thirds (major and minor), fourths, fifths, sixths, sevenths and octaves are possible, but in orchestral writing it will be judicious to use chiefly such as can be played in the first position:—

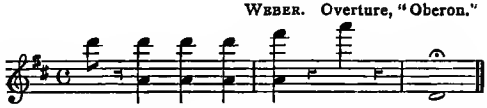
Ex. 3.



Here all the double notes given under (*a*) are perfectly easy and safe; those at (*b*), though quite practicable, are a little less certain, especially if the player has suddenly to leave the first position to take them; while those at (*c*) would be so excessively difficult that no composer of judgment would think of introducing them in orchestral music. It should be added that all

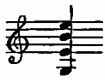
intervals greater than the octave should be avoided, unless the lower of the two notes is one of the open strings G, D, or A, in which case there is no difficulty, *e.g.* :—

Ex. 4. WEBER. Overture, "Oberon."

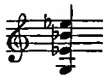


It must also be remembered that rapid successions of double notes are best avoided, because of the difficulty of the sudden changes of fingering.

15. After what has just been said, it will be readily understood that chords of three or four notes are also practicable on the violin, if due regard is paid to the fingering and to the position of the chords. It may be taken as a rule that those chords are best, both as regards sonorousness of tone and ease of execution, which contain at least one open note. Thus this chord—



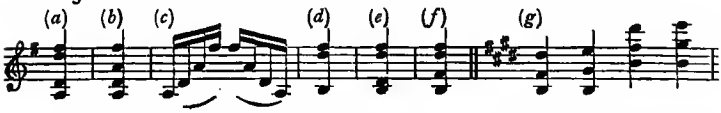
is not only very easy but very effective, while this—



is simply impossible. Here the G is the fourth (open) string; the lower E♭ must be stopped on the D string, and the B♭ on the A string; but as the upper E♭ is *lower* than the open note (E♮) of the first string, and a higher sound but not a lower can be obtained on a string by stopping, the chord is impracticable. If the B♭ be omitted, the upper note can be played with ease on the A string. The following rule will be a guide for the student in this matter: *All chords are impossible which contain three notes below the open string A or four below the open string E.*

16. A few more examples of impossible chords may be given :—

Ex. 5.



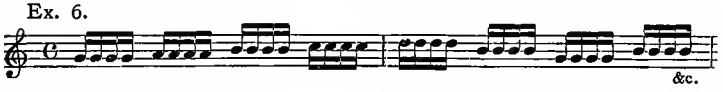
If the student will refer to the fingering for the first position given in Ex. 2 (Sect. 12, *note*) he will see that both the chords (*a*)

and (*b*) are unplayable. The lower note, A, can only be taken with the first finger; but no other finger can reach the F♯ on the first string. In an *arpeggio*, as at (*c*), the passage would be quite easy, because the finger can move from one string to the other quickly enough. Again, the chord (*d*) is impossible, because B must be played on the fourth string, D is too far away to be stopped on the third string; and though it is easy to stop it on the second, the bow cannot jump from the fourth to the second string. By adding a note for the third string, as at (*e*), (*f*), the chord becomes perfectly easy. At (*g*) is shown a succession of chords which, without being impossible, would be very hazardous except in slow *tempo*, owing to the sudden change in the position of the hand. It will be well for the student to restrict himself almost entirely to the use of chords which can be played in the first position. With the explanations just given, and a careful study of Ex. 2, he will have little difficulty in knowing which to avoid.

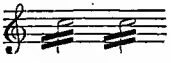
17. It has been seen from Ex. 5 (*b*), (*c*), that a chord the notes of which cannot be all struck at once may be quite possible in *arpeggio*. It may be said, in general terms, that any *arpeggio* is practicable which does not contain too wide intervals. A little consideration of the table of fingering will easily show whether any proposed passage is easy or difficult. Some experience will be required, and here especially a practical knowledge of the violin will be found valuable; for, though reference has chiefly been made to the first position, it would be a mistake to infer that any passage which cannot well be played in this position is therefore necessarily difficult. We cannot, however, spare the space to discuss this question here; the student must refer to some "Violin Tutor" for the requisite information.

18. Repeated notes in moderately quick time, as in the following—

Ex. 6.



are not only perfectly easy but effective. The same may be said of the *tremolo*, which, however, should not be too long continued; not only because it would be monotonous, but because if of too great duration it would become tiring to the player. In writing a *tremolo* the composer must be careful to indicate exactly what he requires, thus, the following—



in a rapid movement would be performed as a *tremolo;* but in an

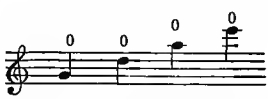
andante or *adagio* it would not be so played; it should then be written—

and even then it would perhaps be safer also to add *tremolo* or *trem.* over the part.*

19. Any possible variety of phrasing is practicable on the violin. It is important for the student to remember that the phrasing ought in all cases to be clearly indicated, not only for the violin, but for all other instruments; because orchestral players, if no phrasing is marked, invariably detach every note.

20. *Sordini* (*mutes*) are little instruments made of wood or brass, which when placed on the bridge of the violin deaden the sonorousness in a remarkable degree, and produce a thin veiled tone difficult to describe, but perfectly familiar to all listeners to orchestral music. Their employment is indicated by the words *con sordini;* and when their use is desired, the composer must remember to give a short rest to the instruments, to allow the players time to place the mutes on the bridges. About two or three bars of moderate time will be sufficient. For their removal (marked *senza sordini*) a shorter rest will suffice.

21. *Harmonics* are sounds which are produced by merely *touching* the string with the finger, instead of pressing it firmly against the finger-board. By this means tones of a peculiarly clear quality are obtained. It is chiefly in solo-playing that harmonics are employed; in orchestral music it will be well to use only the touched octave of the four open strings. When harmonics are desired they are indicated thus—0. The four notes just named would therefore be written as follows :—



The student who desires full information on harmonics will find it in Berlioz's treatise on Instrumentation.

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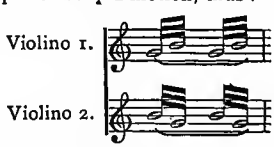
* Another variety of *tremolo* which may be described as a *legato tremolo* has been made use of by some modern composers. It is produced by the crossing of two violin parts in rapid motion, thus :—

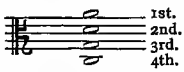


It will be seen that both notes are heard in constant iteration, but with a *legato* unattainable in the ordinary manner. This kind of *tremolo* has been frequently employed by Wagner.

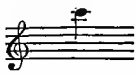
22. Sometimes, instead of using the bow, the violin-player twitches the strings with the first or second finger of his right hand. This effect is called *pizzicato*, and is indicated in the score by the abbreviation *pizz*. The student must remember not to write too rapid passages to be played in this manner, as they would be impracticable. Where the bow is again to be used, *col arco* or simply *arco* is written over the violin part.

23. In the orchestra the violins are usually divided into two parts, one at each side of the conductor. The highest part is in general given to the first violins, though the seconds may occasionally cross above them; the second violins play the second part of the harmony, the violas the third, and the violoncellos and double-basses in octaves (as will be explained presently) the fourth part. As the music for the strings is mostly (though by no means invariably) written in four-part harmony, the collective body of stringed instruments is often spoken of, inaccurately but conveniently, as the quartett. The student will remember, if this expression is used hereafter, that it is not meant that each part is played by only one instrument.

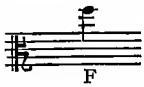
24. II. THE VIOLA (called in English the "Tenor," in French the "Alto," and in German the "Bratsche").—This instrument is in reality a larger-sized violin, which in many respects it closely resembles. It has four strings, tuned by fifths, and a perfect fifth lower than those of the violin:—



Music for the viola is always written in the C clef on the third line, excepting when the higher notes would require too many leger lines; in this case the G clef is used, as for the violin. For orchestral music the practical limit to the compass of the viola is about—



but it is seldom that even this height is reached; a more common range being to—



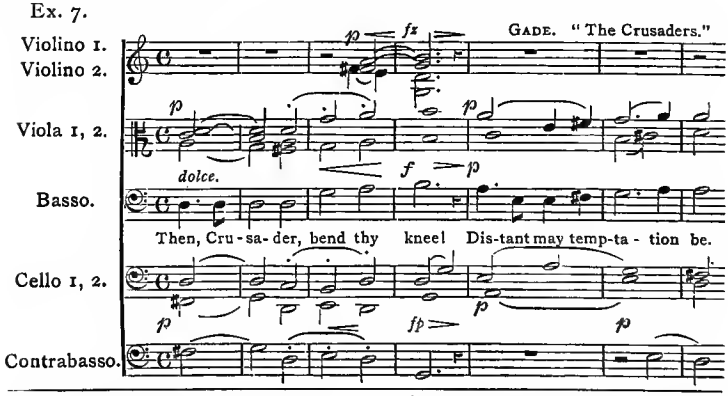
25. All that has been said above with regard to the violin, as to fingering, double notes, chords, *arpeggios*, *tremolo*, *sordini*, *pizzicato*, &c., applies equally to the viola. In calculating fingerings, &c., it must be remembered that all the illustrations given in Exs. 1, 3, 4, and 5, must for the viola be *transposed a fifth lower*. In order to obtain an additional part to the harmony, the violas are frequently divided into firsts and seconds. This is indicated either by the word *divisi*, or by *a due* (or

"a 2")* over the part. Where they are to play together again *unis.* (abbreviation of *unisoni*) should be written.

26. The quality of tone of the viola differs altogether from that of the violin. It is far less brilliant, but richer: and for this reason, when a peculiar effect of colouring is desired, the viola may be written as the highest part in the string quartett. This has been done by Mendelssohn in his air "Lord God of Abraham" in "Elijah," where the melody is chiefly given to the violas; another interesting example may be seen in the chorale at the beginning of Bennett's overture to "Paradise and the Peri." Here, however, the violins are silent, and the violas are accompanied by the violoncellos in two parts, the double-basses, and the softer wind instruments.

27. Owing to the peculiarly penetrating quality of tone of the violas, it is not needful that in an orchestra they should be as numerous as the violins; and even when divided their tone will still be sufficiently prominent, if the parts be judiciously written. Sometimes, where a very quiet accompaniment is desired, the bass of the harmony is given to the violas alone, as in the adagio commencing the well-known scena, "Softly sighs," from the "Freischütz." Again, a good effect is often obtainable by a four-part harmony for divided violas and violoncellos only. In the following extract from Gade's "Crusaders," the student will see not only an excellent example of this method of accompaniment, but also how a sudden *crescendo* can be obtained (at the third bar) by adding the violins for only two notes to the other instruments:—

Ex. 7.



* It is important to remember that "a 2" is used in orchestral scores in two precisely opposite ways. If placed over a part (such as the violas) in which all instruments usually play in unison, it is equivalent, as explained in the text, to *divisi;* but if written over a line in which there are two parts (*e.g.*, the flutes or oboes). it indicates that the two instruments are to play in unison.

From the following example from Wagner's "Walküre," it will be seen that such a method of accompaniment is available in forcible no less than in quiet passages :—

Ex. 8.

WAGNER. "Die Walküre."

Viola 1.
Viola 2.
Tenor.
Cello 1.
Cello 2.

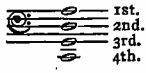
Wol - fe, der war mein Va ter; zu

dim. p più p

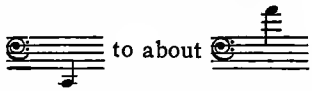
zwei kam ich der Welt, ei - ne Zwil - lings-schwes-ter uud ich

If the student examines the above extract, he will see that it would be quite possible, without changing a note, to arrange it for two violins, viola, and violoncello; but the effect of such a distribution would be quite different from that here obtained. Similar combinations may be frequently met in the works of other modern composers, especially of Mendelssohn; and the student will do well to analyse them, and note the various and varying effects of the different methods of scoring. He will in this way learn more than could be explained in a dozen pages. The analysis of scores is indispensable for the thorough learning of instrumentation.

28. III. THE VIOLONCELLO.—Like the instruments already noticed, the violoncello has four strings tuned by fifths, an octave lower than the viola :—



For orchestral purposes its compass is from—

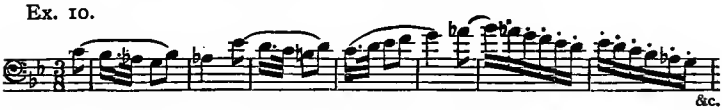


or even a note or two higher. Music for the violoncello is written in the F clef except when it goes high, and the C clef on the fourth line is used; sometimes also the G clef. There are unfortunately two ways in which this last clef is used. In the older scores, especially in solo passages, it was the custom to write the high notes in the G clef *an octave higher than they would sound;* and in that case the G clef was written immediately after the F clef. Thus the following passage—

Ex. 9. BEETHOVEN. Quartet, Op. 59, No. 1.

would be played in this way :—

Ex. 10.

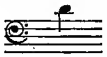


Modern composers almost invariably use the tenor clef for the higher notes, and restrict the employment of the G clef to the rare occasions (in orchestral music at least) when a passage exceeds the range of the tenor clef; the notes in the G clef are then written *as played.** For all orchestral purposes the student will find the F and C clefs quite sufficient.

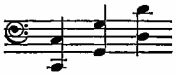
29. Owing to the greater length of the strings, the fingering of the violoncello differs considerably from that of the violin and viola; and many passages that on the latter instruments are perfectly easy, would on the former be difficult, if not impossible. This is especially the case with double notes and chords. Our space will not allow us to enter on a dissertation on the fingering

* An exception to this general rule may be seen in the full score of Schumann's "Faust" (p. 162), where a violoncello solo is written alternately in the F and G clefs instead of the F and C. The notes in the G clef are written as played, not an octave higher.

of the violoncello, for which the student must refer to a good instruction-book. Unless he has such practical acquaintance with the instrument as to know what double notes and chords are easy and effective, he will do well to use them sparingly, the more so as they are seldom required in orchestral writing. In the first bar of Ex. 8 (p. 21) three chords for the violoncello are seen. The student will observe that these are all very easy: the first and third contain a perfect fifth, obtained by laying one finger across two strings; while the second has an open string for its lowest note. Thirds, fourths, fifths, and sixths are easy, if not written above—



The octave should be avoided in orchestral writing, excepting—



which are perfectly easy, as the lower note is on an open string.

30. The *sordini* are sometimes used for the violoncello, but less frequently than for the violins and violas. The difference in the tone made by the mute is less marked on this instrument than on those, which is perhaps the reason that it is seldomer employed.

31. The violoncello is used in the orchestra in two different ways—to furnish the bass of the harmony (for which purpose the double-bass usually plays in octaves with it) and as a solo instrument. With regard to the first-named use, it will be well to remind the student that, though rapid passages are possible and often easy, they should be used with great moderation. Every musician knows the importance of a firmly moving bass part as a foundation for the whole harmonic structure. On this point, which belongs rather to Composition than to Instrumentation, it is not needful to enlarge; but it should be said that rapid passages are much less effective on the violoncello (especially on the lower strings) than on the more acute instruments, for the obvious reason that, the vibrations being slower, the note takes longer to assert itself clearly; and if a note is quitted almost before it has had time to sound, confusion will certainly result. As will be seen hereafter, this is still more the case with the double-bass.

32. For a soft accompaniment, when extremely low notes are not required, the violoncellos are often used without the double-basses. Many instances of this will occur to musicians at once. It will suffice to name the commencement of the

larghetto of Beethoven's Symphony in D, and the first bars of Mendelssohn's air "But the Lord is mindful of his own," in "St. Paul," as illustrations.

33. It has been said above that the bass of the harmony is usually given to the violoncello and double-bass in octaves. Frequently, however, the latter instrument plays the bass alone, and the violoncello either doubles the viola in unison, or adds another middle part to the harmony, or has the melody allotted to it. As a melodic instrument the violoncello, in the upper part of its compass, is one of the most expressive in the orchestra. There is a richness and sweetness about its tone—especially when several violoncellos are playing in unison—that nothing else can replace. As a familiar example of this effect may be named the opening of the slow movement of Beethoven's Symphony in C minor, in which, by the way, the violas play in unison with the violoncellos, adding power without obscuring the quality of tone, to which that of the viola is sufficiently similar. Mendelssohn was very partial to this effect, as may be seen in the opening symphony of the song "It is enough" in "Elijah," in the overture to the "Son and Stranger," and in the following passage from the "First Walpurgis Night":—

Ex. 11. MENDELSSOHN. "First Walpurgis Night."

Violino 1.
Violino 2.
Viola.
Violoncello.
Contrabasso.

34. One violoncello solo is also frequently employed in the orchestra. This effect was known to Handel, who has used it in "Gentle airs" ("Athalia"), "What passion cannot music raise and quell" (Dryden's "Ode"), and to Bach, whose air known in English as "My heart ever faithful," with its violoncello *obbligato*, is familiar to all concert-goers. Of more recent composers, it will suffice to mention Mozart ("Batti, batti," in "Don Giovanni") and Mendelssohn ("Be thou faithful unto death," in "St Paul"). Where one violoncello is treated as a solo instrument, the others usually (but not invariably) play with the double-basses. It may be said here, once for all, that when we speak of playing "*with* the double-basses," it is playing in the octave above that is really meant.

35. Modern composers have sometimes obtained excellent effects by full harmony for several violoncello parts. Rossini

was one of the first to do this, in the introduction to his overture to "Guillaume Tell," which is written for five violoncelli *soli*. This passage is so well known that it will probably be more interesting to our readers to give another, and perhaps even finer example, by the greatest living master of instrumentation—Wagner. It will be seen that the melody is played by a solo instrument, and each part of the accompaniment is doubled :—

Ex. 12. WAGNER. "Die Walküre."

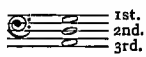
1 Cello solo.
2 Celli 2.
2 Celli 3.
2 Celli 4.
2 Celli 5.
2 Contrabassi.

più p

più p

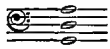
36. IV. THE DOUBLE-BASS (*Contrabasso*).—Of this most important instrument two varieties are in use in most modern orchestras, the one having three strings and the other four. Till within a comparatively recent period the former was almost exclusively employed in this country, while the four-stringed basses are chiefly to be met with in Germany.

37. The three-stringed double-bass is usually tuned in fourths :—



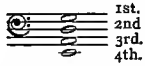
It has been already mentioned that the notes produced are an octave lower than those written, viz.—

the present being the first example we have yet met with of what is called a "transposing instrument," that is to say, one in which the notes sounded differ from those written. The method of tuning given above, though frequently adopted, is by no means universal; many players, in order to extend the compass of their instrument downwards, tune the third string to G, or sometimes even lower; while others, especially in France, tune the three strings by fifths:—

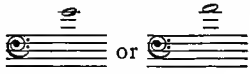


It may almost be said that in the matter of tuning every player does that which is right in his own eyes; and the composer therefore need not trouble himself about considerations as to open strings, as in writing for the violin.

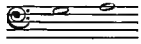
38. The four-stringed double-bass is also usually tuned in fourths—



the sounds being, of course, an octave lower than written. It will be seen that these instruments possess the advantage of a compass at least a third lower than the three-stringed basses; on the other hand their tone is rather less powerful; and the best effect in the orchestra will be obtained if there be about an equal proportion of both kinds of basses. For both instruments the upward compass is the same, being for orchestral music about to—



which of course sound—



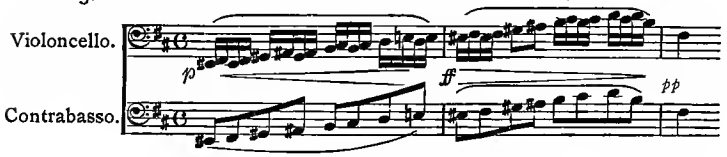
The F clef is exclusively used in notation, and the part is usually written on the same line as the violoncello (indicated *Cello e Basso*, or simply *Bassi*), unless the former has an important separate part, when one stave is allotted to each.

39. Like the three-stringed bass, that with four strings can be tuned in various ways; and modern composers have sometimes indicated particular tunings in order to produce special effects. Thus Brahms, in his "Deutsches Requiem" for the long pedal-point at the end of No. 3, has directed that "Some double-basses tune the E string down to D" (p. 80 of the full score); and Wagner, in the introduction to the "Rheingold," has half his double-basses tuned down to E♭; while in the second act of "Tristan und Isolde," two basses have to tune their E down

to C♯. These, however, are exceptional cases, and the composer must remember that if he alter the tuning of the instrument, it throws on the player the responsibility of transposing all passages played on the altered string; it will be safer therefore to calculate only on the ordinary compass.

40. Owing to the greater length of the strings, the fingering of the double-bass differs entirely from that of the other stringed instruments. When tuned in fifths it is not possible even to play a scale without shifting. But apart altogether from any questions of technical difficulty, it must not be forgotten that rapid passages on the double-bass are almost always ineffective. What was said on this point as to the violoncello applies here with even greater force. On the lower strings especially the notes have not time to sound if they succeed one another too rapidly; and though good players are quite able to finger them, the effect is seldom satisfactory. In such cases it is best to simplify the double-bass passages, as Mendelssohn has done in the following example:—

Ex. 13. MENDELSSOHN. Overture, "The Hebrides."



Occasionally rapid passages may be used with good effect, as for instance by Beethoven in the Storm of the "Pastoral" Symphony, where the vague mutterings of the tempest are depicted by an indistinct murmur in the extreme depth of the orchestra; but, as a rule, clearly defined and not too quick progressions of the basses will produce the best effects.*

41. Double notes, though in some cases practicable, are very rarely used on the double-bass. Owing to the different methods of tuning it is quite possible that what is easy for one player may be impracticable for another; it will therefore be better, if

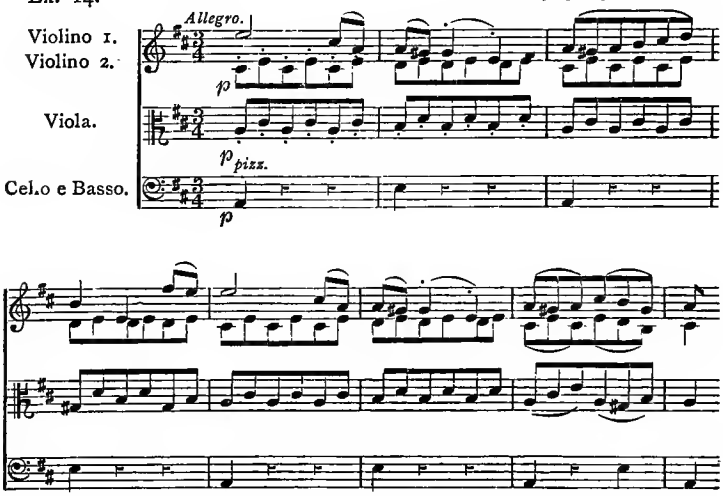
* In the movement just referred to, Beethoven has written for the double-basses down to—

The composer must remember that if he writes for the violoncellos lower than the compass of the double-bass (taking into account, of course, the difference of octave), the players on the latter instrument will transpose their part an octave higher, and give the actual notes written, instead of the octave below.

two double-bass notes are required, to divide the instruments into firsts and seconds. *Sordini* are occasionally (but very seldom) marked for the double-basses, as they make but little difference in the tone; many players, indeed, do not possess them.

42. The *pizzicato* both of the violoncello and double-bass is especially effective, and is often used when the rest of the quartett is playing with the bow, *e.g.*:—

Ex. 14. HAYDN. Symphony in D, No. 5.



In this passage more *point* is given to the bass by the employment of the *pizzicato*, and it stands out more prominently through the other parts. (Compare Ex. 22). Sometimes the double-bass alone has the *pizzicato*, while the violoncellos play with the bow. A good example of this effect will be seen in the first song in Beethoven's "Mount of Olives" (pp. 16 and 17 of the full score). See also Ex. 27 within.

43. Having explained the compass and resources of each class of stringed instruments, it now remains to speak of their treatment in combination. It is quite impossible within the limits of this Primer to do more than give a few general principles. It has been already mentioned (Sect. 23) that music for the strings is frequently written in four-part harmony. It is but seldom, however, with modern composers that strict four-part writing is long continued, even if the strings alone are employed. Sometimes one part is doubled, either in the unison or the octave, as in the two following examples by Mozart:—

Ex. 15.

MOZART. Overture, "Don Giovanni."

Molto Allegro.

Violino 1.
Violino 2.
Viola.
Violoncello e Basso.

p

Cello.

Basso.

Ex. 16.

MOZART. Symphony in G minor.

Allegro molto.

Violino 1.
Violino 2.
Viola.
Violoncello e Basso.

divisi.

p

As in previous examples, the two violin parts are printed on one stave, to save space. The student will remember that each in scores is written on a separate line. In the quotation from the overture to "Don Giovanni" it will be seen that there is only three-part harmony till the last bar but one, the violas and violoncellos playing in unison. The passage also affords an example of harmony without the double-basses (Sect. 32). In Ex. 16 we see a four-part harmony with the melody doubled in the octave by the second violins. The passage is also an early instance of the division of the violas mentioned in Sect. 25. On the other hand, by the use of the "double string" (Sect. 14) harmony in five or six parts is often obtained from strings alone. Examples may be found in nearly every modern score.

44. Owing to the general resemblance in the quality of tone on the different stringed instruments, it is possible to divide an extended passage between the various parts without any marked change of tone-colour. This will be seen from the following example :—

Ex. 17. BEETHOVEN. Overture, "Leonora," No. 1.

Andante con moto.

Violino 1.

Violino 2.

Viola.

Violoncello.

A similar passage played by various wind instruments would, owing to the difference of *timbre*, produce by no means the same effect.

45. The whole mass of strings playing in unison (*i.e.*, of course, in unisons and octaves) in a *forte* or *fortissimo* passage is always effective, provided care be taken not to separate the parts too widely. Thus, in the following example—

Ex. 18.

(a) V. 1. V. 2. (b) (c)

Viola.

Cello e Basso.

the distribution of parts (at *a*) is bad, there being an interval of two octaves between the second violin and viola, and the middle being left empty. If the brilliancy of the upper notes is specially required, the parts should be written as at (*b*); while the arrangement (*c*), though less brilliant, would be fuller and more sonorous. A similar remark will apply to passages for strings in full harmony; and the student is advised to examine on this point the finale of Beethoven's Symphony in C minor, bearing in mind the general principles here laid down, and observing how they are carried out in the score.

46. The *pizzicato* of the strings can be used in various ways. Sometimes, as in the following example, we find the whole mass of strings played thus, without any accompaniment:—

Ex. 19.

Allegro con fuoco. MENDELSSOHN. Symphony in C minor (finale).

Violino 1.
Violino 2.
Viola.
Violoncello e Basso.

pizz. *fp*

The student should note, in passing, how at the first bar of the above, where the middle part of the harmony goes below the compass of the second violin, the composer helps himself with the viola. Such cases are of frequent occurrence. The *pizzicato* is often used as an accompaniment to a solo, either of the voice or of a wind instrument. The solo part thus stands

out more clearly than if the strings were played with the bow :—

Ex. 20 SPOHR. Overture, "Jessonda."

Corno 2 in E♭.*
Violino 1, 2. (*unis.*)
Viola, Bassi. (*unis.*)

Moderato. *pizz.* *p* *pizz.* *p*

A good instance of this effect may be found in the accompaniment of the tenor song, "Unter blüh'nden Mandelbäumen," in the first act of Weber's "Euryanthe;" while another, equally good, though in a totally different style, will be seen in the first movement of the scena, "Ah! quelle nuit," from Auber's "Domino Noir." (See Ex. 84.) A *pizzicato* accompaniment in a middle part, while the other strings play with the bow, is also sometimes to be met with, *e.g.* :—

Ex. 21. BEETHOVEN. "Prometheus," No. 15.

Violino 1.
Violino 2.
Viola.
Bassi.

Adagio. *p* *pizz.* *p*

Here we have only a three-part harmony; the violas doubling the basses either in the unison or octave; but the figure of broken

* For an explanation of the notation of the horn see Sects. 67, 68.

chords for the second violin prevents any effect of thinness. Let the student notice also the *compactness* of the harmony and the position of the various parts.

47. The effect of the *sordini* has been already referred to (Sect. 20). They are chiefly used for the expression either of melancholy, sometimes mysterious, effects, or of very light fairy-like passages, as, for instance, in the "Queen Mab" scherzo of Berlioz's "Romeo and Juliet," or the "Dance of Dryads" in Raff's "Im Walde" symphony. They are also very useful in light accompaniments for vocal music. Beethoven frequently puts them on the violins and not on the rest of the strings:—

Ex. 22. *Adagio un poco mosso.* BEETHOVEN. Concerto in E flat.

Violino 1. *Con sordini.*
Violino 2. *Con sordini.*
Viola.
Bassi. *pizz.*

cres.
cres.
arco.

Here the telling notes of the violas on their fourth string always stand out rather prominently through the sounds of the muted violins. The more usual plan is to add *sordini* for violas also, and sometimes (though rarely) to the basses. The above quotation gives another example of the *pizzicato* of the basses as an accompaniment. The next extract will show how

strings *con sordini* may be used for the purpose of accompaniment :—

Ex. 23.

Allegro assai.
Con sordini.

AUBER. "Le Domino Noir."

Violino 1.

Con sordini.

Violino 2.

Con sordini.

Viola.

ANGÈLE.

Voice.

L'heu re, la nuit tout m'est pro - pi ce,

Violoncello.

Con sordini.

Basso.

Con sordini.

du cou - ra - ge, ne tremblons pas,

Though *sordini* are marked for the double-basses, it is doubtful if they are generally used, as many players do not possess them. The student will notice here the charming effect of the violoncellos treated as melodic instruments, and moving in sixths below the voice part.

48. In modern compositions the violin parts are frequently divided, generally into two parts each, occasionally into more. Though the effect is as old as the time of Handel, who, in his overture to "Athalia," has four violin parts instead of two, it is curious that it does not seem to have been employed either by Haydn, Mozart, or Beethoven. One of the earliest modern instances of its use is probably in the overture to the "Midsummer Night's Dream":—

Ex. 24. MENDELSSOHN. Overture, "Midsummer Night's Dream."

Allegro di molto.

divisi.

Violino 1.

pp

Violino 2.

divisi.

Sometimes the first violins only are divided, playing in octaves, in order to bring a melody into greater prominence, as in the following passage from the "Cujus animam" of Rossini's "Stabat Mater":—

Ex. 25. ROSSINI. "Stabat Mater."

divisi.

Violino 1.

&c.

49. No one has displayed more ingenuity than Wagner in the division of his string parts. Most musicians are familiar with the ethereal effect obtained in the prelude to "Lohengrin" by the division of the violins on the highest part of their scale :—

Ex. 26. WAGNER. "Lohengrin."

Lento.

Violino 1.

Violino 2.

Violino 3.

Violino 4.

p

dim.

In his later works Wagner has attempted still more complicated divisions. For example, in the second act of "Tristan und Isolde" (p. 239 of the full score) the strings are divided into fifteen real parts. Such an elaborate arrangement involves so much practical difficulty in performance, that the student is advised to confine himself to the ordinary division of each part into two, and not even to use this unless for some special effect that cannot be obtained in any other way. The simpler the distribution of the music the better will be the chance of an adequate performance.

50. A solo violin can sometimes be effectively combined with the other strings; not so much as an *obbligato* instrument

throughout a movement, but, so to speak, incidentally, and for a particular passage. Of the treatment of the violin as a solo instrument we shall speak hereafter (Chap. IX). The following passage will illustrate what is here meant:—

Ex. 27. SCHUMANN. Symphony in D minor.

Poco lento.

Violino Solo. *p dol.*

Violino 1.
Violino 2. *p dol.*

Viola.

Violoncello. *divisi.*

Basso. *pizz.*

tr

The score of this passage also contains parts for horns and bassoons; but as these merely reinforce the harmony by doubling some of the middle parts, they are omitted, to save space. The student will notice that in the last bar but one the accidental sharp to G appears twice in the viola part. It is important to remember that whenever two parts are written on the same stave (as here or with most wind instruments) it is

needful that all accidentals should be marked *in both parts*, because the copyist is almost certain to write each on a separate stave. Another good example of a violin solo may be seen near the close of the slow movement of Brahms's Symphony in C minor.

51. It is hoped that the student will by this time have some idea of the treatment of the strings of the orchestra as a separate mass. In our next chapter we shall endeavour to point out how to combine them in various ways with the wind. It must not be forgotten that, after all, the strings are the foundation of the orchestra; and upon the way in which the composer has written for them will very largely depend the effectiveness, or the reverse, of his music.

CHAPTER III.

STRINGS, OBOES, BASSOONS, AND HORNS.

52. To the stringed instruments, with which the student is by this time acquainted, we shall now add by degrees the various wind instruments which form so important a part of the modern orchestra: and we shall begin with oboes, bassoons, and horns, which when combined with the strings give the complete instrumental force in general use at the end of the last century.*

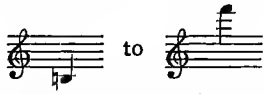
53. If we compare a modern orchestral score with one of a hundred years ago, we shall find that the chief difference lies not so much in the number of wind instruments used as in the method of their employment. In Handel's scores, for example, though occasional solo passages for the wind are to be met with, yet these instruments usually double the string parts in unison. The music of Bach is so polyphonic that his scores are exceptional; and though the wind instruments certainly have independent parts, they are very seldom treated in the modern fashion. The modern school of orchestration may be said to have been founded by Haydn, improved by Mozart, and perfected by Beethoven and Weber. The additions to our resources which have been made since the time of Beethoven have consisted rather of the introduction into the orchestra of new instruments than of any important modification in the treatment of those previously employed.

54. Wind instruments are used in the orchestra in three different ways—as solo instruments, as a separate mass, or combined in various ways with the strings. Examples of each method of treatment will be met with as we proceed; but it will be needful, before teaching how to combine them, to explain the compass and resources of each.

---

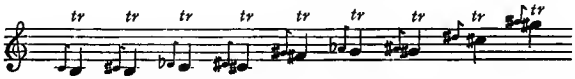
* The modern orchestra in ordinary use contains, besides stringed instruments, two flutes, two oboes, two clarinets, two bassoons, two (or four) horns, two (occasionally three) trumpets, three trombones, sometimes also an ophicleide or bass-tuba, besides the percussion instruments (kettle-drums, &c.), which, though not properly wind instruments, are always counted among them.

55. THE OBOE (*Ger.* Hoboe; *Fr.* Hautbois).—This important instrument is played by means of a "double reed." Its compass is from—



Some oboes also possess the lower B♭, but this note is scarcely ever written for the instrument; though an instance may be seen in the intermezzo of Mendelssohn's "Midsummer Night's Dream" music. On the other hand, the upper E and F are of great difficulty, and seldom used except in solo passages. For orchestral writing it will be safest to limit the upward range of the instrument to D or E♭.

56. The oboe possesses a complete chromatic scale, and music for it is always written in the G clef. From the method of its fingering, some keys are easier than others; the best are those which have not more than three sharps or flats in the signature. In these keys most ordinary passages, whether chromatic or diatonic, will be tolerably easy of execution. There are certain shakes which, for technical reasons, should be avoided. These are—



and all above the upper D, all of which are either difficult or absolutely impossible.

57. It has just been said that most ordinary passages are tolerably easy for the oboe; but it must not be thence inferred that they will necessarily be also effective, or even in all cases suitable for the instrument. Here we meet for the first time with a consideration of the utmost importance in orchestral writing—the necessity of considering the *genius* of each different instrument; that is, its special peculiarities as regards quality of tone, the manner it combines with other instruments, &c. For example, the following passage, from the introduction to Haydn's "Creation"—

given in the score to the clarinet, is most effective on that instrument; but if played on the oboe it would sound absurd. The oboe is essentially a melodic instrument; and with very rare exceptions (such as the oboe solo in the third *entr'acte* of Beethoven's "Egmont" music) rapid passages are ineffective on it. But, if properly treated, it is equally useful for the expression

of melancholy, tenderness, and gaiety. A few examples from the works of the great composers will best illustrate this :—

Ex. 28. SCHUBERT. Symphony in C.

Andante.

Oboe 1.

Violino 1.
Violino 2.

Viola.

Bassi.

decres.

Ex. 29. HAYDN. "The Seasons."

Adagio.
1mo.

Oboi.

Cantabile.

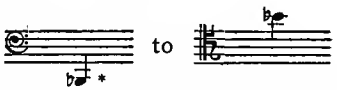
Violino 1.
Violino 2.

Viola.
Bassi.

No passages were ever written for the oboe better suited to it and more effective than these two, while an equally fine example of a lively melody given to the instrument will be found later in this chapter (Ex. 39). The scores of the great masters abound in such passages; and by carefully studying and comparing them the student will learn better than in any other way how to write for the instrument. As specimens especially worthy of his attention may be named the opening symphony of Annette's song in the second act of the "Freischütz;" the "Poco Andante" in the finale of the "Eroica" Symphony; the accompaniments to the airs, "O God, have mercy," in "St. Paul," and "For the mountains shall depart," in "Elijah;" and the allegretto movement in the symphony of Mendelssohn's "Lobgesang."

58. The oboe requires so little wind that the performer when playing it is obliged constantly to hold his breath. It is therefore absolutely necessary to give him frequent rests for breathing. There is no instrument in the orchestra for which this is a matter of equal importance, and the student must be especially careful not to fatigue the player. Besides this, the pressure of the lips upon the reed soon produces a strain on the muscles of the mouth which will, unless proper rests be allowed, entirely incapacitate the player from producing a proper tone. The same remarks apply, though to a less extent, to all other wind instruments.

59. II. The Bassoon (*Ital.* Fagotto; *Ger.* Fagott; *Fr.* Basson).—This instrument may be considered as the bass of the oboe, which it resembles in being played with a double reed. It forms the bass of the whole family of wood instruments, and is in many respects one of the most important components of the orchestra. Its compass is from—



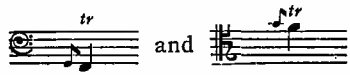
with all the semitones; in solo passages it sometimes ascends a few notes higher; but it will be well in orchestral music to write nothing above the B♭. The part of the bassoon is written in the F and C clefs; the latter, on the fourth line, being used (as with the violoncello) for the higher notes.

---

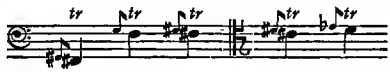
* Some bassoons have also the low A—

but as this note is not general, it had better be avoided, though Wagner has frequently used it in his "Ring des Nibelungen."

60. The fingering of the bassoon somewhat resembles that of the oboe, and the easiest keys are those which have not more than three flats or sharps in the signature. All shakes, whether with a tone or a semitone, are practicable between—



except the following, which are either difficult or impossible, and should be avoided:—



Shakes at either extreme of the compass of the instrument are impracticable.

61. There is no wind instrument capable of more variety than the bassoon. Rapid passages, if written in favourable keys, and not too much on the lower notes, are easy to play and effective; *e.g.*, the bassoon solo in the finale of Beethoven's Symphony in B flat. Sustained melodies in the upper octave are full of expressiveness; the tone of the bassoon in this portion of its register has some affinity with that of the violoncello, and also, to a certain extent, resembles a tenor voice:—

Ex. 30. *Andante con moto.* WEBER. Mass in G, "Agnus Dei."

Fagotti. Solo. *p*

Violino 1. *p*

Violino 2. *p*

Viola. Bassi. *p*

Berlioz, in his "Treatise on Instrumentation," says: "When M. Meyerbeer, in his resurrection of the nuns, wished to find a pale, cold, cadaverous sound, he obtained it from the weak middle notes of the bassoon." The author was evidently not aware that Handel had done precisely the same thing a century before in the scene between Saul and the Witch of Endor. Not only from its historical interest, as a very early instance of the solo employment of the bassoon, but from the excellence of the musical effect, the passage is worth quoting:—

Ex. 31.

HANDEL. "Saul."

Largo.

Fagotti. *p*

Voice. SAMUEL. Why hast thou forced me

Bassi.

from the realms of peace back to this world of woe?

62. For the production of grotesque effects no instrument equals, or even approaches, the bassoon; it may indeed be called the clown of the orchestra. Good old "Father Haydn," overflowing as he was with fun, seems to have been the first to perceive this, and many comic passages for the bassoon will be found in his symphonies. It will suffice to refer to the—

ff

for the two bassoons, entirely unaccompanied, in the slow movement of the Symphony in D (No. 2 of the "Salomon Set"), as an illustration. Mendelssohn has employed the same instruments with excellent effect to accompany the entry of the Clowns in the "Midsummer Night's Dream" music:—

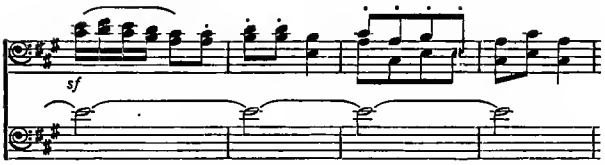
Ex. 32.

MENDELSSOHN. "Midsummer Night's Dream." (Intermezzo.)

Allegro molto comodo.

Fagotti. *psf*

Violoncello.

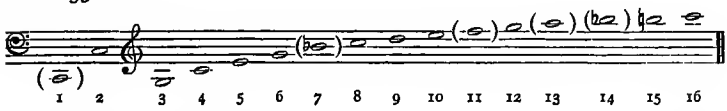


63. The bassoon is frequently used merely to strengthen the bass. In this capacity it is especially useful when the violoncellos are separated from the double-basses, as the low notes of the latter, if not reinforced by their upper octave, will frequently be too far removed from the rest of the orchestra; and the tone of the bassoon approximates quite sufficiently to that of the violoncello to be able to replace it under these circumstances.

64. THE HORN (*Ital.* Corno; *Fr.* Cor).—This is the first we have yet met with, and in many respects the most important, of the family of brass instruments. Two kinds of horns are used in our orchestra: the natural horn, sometimes, for a reason which will be explained presently (see Sect. 72), called the "hand-horn" (*Ger.* Waldhorn); and the chromatic-, valve-, or ventil-horn. We shall first explain the peculiarities of the natural horn, as being both the older and the more frequently written for.

65. In the oboe and bassoon the various notes are obtained by closing or opening, with the fingers, holes in the tube of the instrument. It is only in the second octave of their scale that a difference in the pressure of air is employed to obtain a difference of pitch. In the natural horn, on the contrary, excepting in one case to be presently mentioned (Sect. 72), all the sounds are produced by the varying force of wind in the tube, according to the pressure of the player's lip. As the sounds obtained in this way are those of the natural harmonic series,* it follows that the horn cannot have throughout its compass a complete chromatic or even diatonic scale of natural notes. The harmonic series of a tube, the lowest sound of which is C, will be the following:—

Ex. 33.



Of these notes, those in brackets are not in ordinary use. The fundamental tone cannot be obtained with the usual mouthpiece;

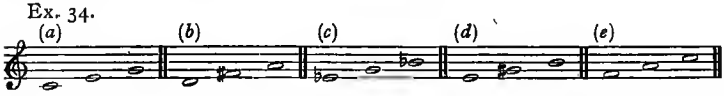
* For an explanation of the harmonic series, see Dr. Stone's "Scientific Basis of Music."

and the notes numbered 7, 11, 13, and 14, are too much out of tune with the tempered scale to be available without artificial modification.

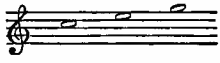
66. If other notes, not forming part of this series, are required from the horn, they can only be obtained from it by altering the length of the resonant tube. This can be done in two ways, either by the use of different "crooks"—*i.e.*, adding pieces of tubing of various lengths, according to the fundamental note that is required—or by "valves" or "pistons," which also alter the length of the tube by allowing the column of air to be diverted from its regular course into additional tubes connected with the main tube of the instrument, by pressing down a piston or a valve with the finger.

67. As the *relation* of the sounds in the harmonic series to one another is the same whatever be the length of the tube, it follows that with each different crook a new series of notes will be produced. Thus, in the following example—

Ex. 34.



if the player has his "C crook" on, he can produce the three notes at (*a*). Precisely the same blowing with the D, E♭, E♮, or F crooks, will give the notes at (*b*), (*c*), (*d*), and (*e*) respectively. As the pressure of the lip (technically called the "embouchure") is always the same for the same tonic or dominant, &c.—the actual sound produced depending upon the length of tube in use—horn parts are always written in the key of C, to save the player the labour of mentally transposing his part; and the key to be employed is indicated at the commencement of the movement. Thus, in Ex. 34, to obtain the notes at (*a*), (*b*), (*c*), (*d*), or (*e*), we should write—



prefixing the words "Corni in C," "Corni in D," or "in E♭," "in E," or "in F."

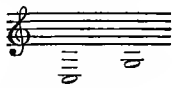
68. The notation just given requires a little further explanation. It will be seen that the passage is written an octave higher than at Ex. 34 (*a*). The horn "in high C," sounding the notes as actually written, is not at present in use; and the C crook of the horn will give notes an octave lower than they appear on paper. The crooks at present in use on the horn, with the transpositions

effected by them, as compared with the notation, will be seen from the following table :—

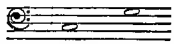
Horn in B♭ *alto*—*transposes*		a tone lower.	
,, in A	,,	a minor 3rd lower.	
,, in G	,,	a perfect 4th	,,
,, in F	,,	a perfect 5th	,,
,, in E	,,	a minor 6th	,,
,, in E♭	,,	a major 6th	,,
,, in D	,,	a minor 7th	,,
,, in C	,,	an 8ve	,,
,, in B♭ *basso*	,,	a major 9th	,,

Of these horns, those in B♭ *alto* and A, though frequently used by Mozart and Haydn, are much seldomer employed (especially the former) in modern music. In addition to those just mentioned, it is possible, by drawing out one of the tubes, to lengthen the A horn so as to get "Horn in A♭," and similarly to get horns in G♭, D♭, B *basso* and A *basso*. These, however, are not often used, and are only mentioned for the sake of completeness.

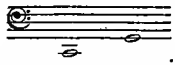
69. Music for the horn is written in the G clef, excepting for the lowest notes, for which the F clef is used. A curious anomaly is observable in the employment of the latter clef. The two lowest notes, which in the G clef are—



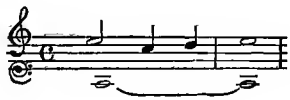
would in the F clef of course be—



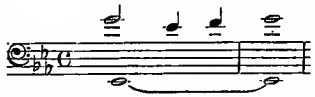
For some reason, not easy to explain, it is the custom to write notes in the F clef an octave lower, thus :—



Sometimes, when the second horn has the low C, while the first is on the upper part of the scale, both clefs are written together on the same stave, thus—

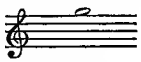


the effect of which on, let us say, the E♭ horn would be—



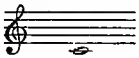
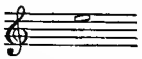
From this peculiarity of notation it results that whereas all notes written in the G clef sound on the horn *lower* than they are written, those in the F clef sound *higher*, excepting in the keys of C, B, B♭, and A *basso*.

70. The compass of the horn cannot be rigidly defined, like that of the oboe or bassoon, because it differs according to the crook employed. The extreme compass is that given in Ex. 33, beginning with No. 2 of the series; but in lower keys, owing to the greater length of tube, the low notes are difficult of production, and slow of speech, while on higher crooks (such as A o B♭ *alto*) the upper part of the series cannot be produced at all. We have not space here to give a complete table of the compass of the horn in every key; the student will find one in Berlioz's "Instrumentation." Meanwhile he may take it as a safe working rule for general purposes that in orchestral music a horn part should not be written above—

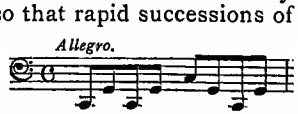


in any key higher than F.

71. There is another consideration to be borne in mind in writing for the horns. It has been already said (Sect. 65) that the various open notes are produced merely by differences of embouchure. These differences are so important that a player who is accustomed to produce chiefly low notes will find it very difficult to play with certainty a passage that lies in the higher part of the compass; and *vice versâ*. Hence the second horn part must not be written very high, nor the first very low. The exact application of this rule will depend upon the key (see Berlioz): speaking roughly it may be said that, except on rare occasions and for special effects, the first horn had better not descend below—

 nor the second rise above 

Even within these limits it must be remembered that sudden changes from high to low notes will always be dangerous and uncertain; and also that rapid successions of low notes, *e.g.*—



are impracticable, because each tone has not time to speak.

72. Hitherto we have mentioned only the *natural* or "open" notes of the horns; but in addition to these various *artificial* ("closed" or "stopped") notes can be obtained, by inserting the hand in the bell of the instrument and partially closing it. Hence the name of "hand-horn" sometimes given to the natural instrument. The effect of this will be to flatten the tone; and the more nearly the mouth of the bell is closed, the more the tone will be lowered. It is important to remember that "stopping" the notes not only alters the pitch, but materially affects the quality. If an open note be lowered to the extent of a semitone, its tone will be somewhat muffled and very different from that of a natural note, but still not bad; whereas, if the hand so far closes the orifice as to lower the sound a whole tone, the artificial note will be bad and dull. It will be well for the student not to write closed notes which are more than a semitone below the open notes given in Ex. 33. Two of the harmonic series (Nos. 7 and 11) furnish, with a little management, two of the best closed notes. No. 7, being rather *below* the real B♭ of our scale, requires to be flattened less than a semitone to make A; and No. 11, being rather too sharp for F, only needs a slight alteration to make it in tune. The less the note requires stopping the better will be its quality.

73. In writing closed notes for the horn (which should at all times be done sparingly) the student must remember to intersperse them with the open notes lying near them. A succession of closed notes will be not only ineffective, but of doubtful intonation.

74. As a general rule, if one pair of horns is employed, it is pitched in the key of the piece, if major; if minor, either in the tonic key or its relative major. Thus, for a movement in D minor, the horns may be either in D or in F; in the former case, the third of the scale, and in the latter the tonic, will not be open notes.* Sometimes, to obtain more open notes, the two horns are in different keys, as in the first movement of Mozart's Symphony in G minor, where we find one horn in B♭ *alto* and the other in G. It is frequently desired to change the key of the horn in the course of a movement. When this is to be done, the composer must allow sufficient bars' rests to allow the player to fit the new crook to his instrument. About eight or ten bars of moderate time ought to be given for this. It will be advisable to remember that it would be very unwise to direct a change from a very high to a low key, or *vice versâ* (as, for instance, from C to A), because the sudden considerable alteration in the length of the tube would render the production of the tone uncertain. When a change is required, it is indicated by the words "*muta* in F," &c.

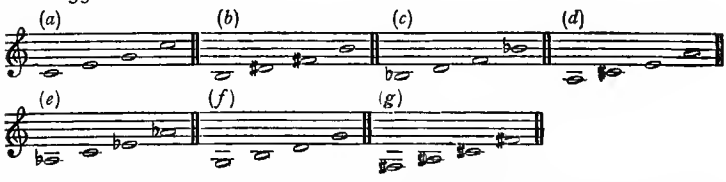
* See also Sect. 76.

75. The old masters usually wrote for two horns, though we occasionally find four in their scores (Handel, "Giulio Cesare;" Mozart, "Idomeneo," &c). But nowadays four horns in the score may be said (at least in large works) to be rather the rule than the exception. If two pairs of horns are written for, it is generally advisable to put each pair in a separate key, so as to obtain a larger number of open notes. These keys will usually be, for a piece in the major, the tonic and either the dominant or sub-dominant; and for a piece in the minor, the tonic and its relative major. It will also be advisable to put the third and fourth horns in the lower rather than in the higher key. But to these rules there are many exceptions (see, for instance, Beethoven's overture to "Leonora," No. 3, and to "Egmont").

76. Even if one pair of horns only be used, it is not always best to write for them in the key of the movement. There are some keys which are better for the instrument than others, viz.: those of F, E, E♭, and D; and it is well to use these as much as possible. Thus, in a movement in A♭, it will probably be much better to write the horns in E♭ (as Beethoven has done in the largo of his first Piano Concerto) than in A♭. In the slow movement of the same composer's Symphony in C minor, which is also in A♭, both horns and trumpets are written in C, because of the counter-subject, in which they play so important a part.

77. Before proceeding to speak of the treatment of the horn in the orchestra, a few words must be said about the valve- or ventil-horn, the use of which is now very general. It has been said in Section 74 that to change the key of the horn by altering the crook requires time. The valves (or pistons, which produce the same effect) furnish a means of instantaneous transposition, by lengthening the tube. There are three valves attached to the horn; the middle one lowers the pitch a semitone, that for the first finger a tone, and that for the third three semitones. In the following example—

Ex. 35.

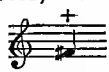


on a valve-horn the notes at (*a*) will be open notes, obtained without the valves. By blowing for the same notes, and pressing the second valve, we get the series (*b*), with the first valve (*c*), with the first and second together, or the third alone (*d*), with the

second and third (*e*), with the first and third (*f*), and with all three (*g*). We have only given a few of the open notes as an illustration; all others will be affected in the same way; and a moment's thought will show the student that with this mechanism we have a horn possessing a complete chromatic scale throughout its entire compass.

78. Many modern composers use the ventil-horn exclusively; while some go so far as to write for it only in the key of F. Many of our orchestral players also always use the F horn, and transpose by means of the pistons the music written for a horn in any other key. This plan is by no means to be recommended.*

79. All closed notes are possible on the ventil-horn; because as every note can be played as an open note, it is obvious that it can also be lowered by the hand, as with the hand-horn. When closed notes are required they must be expressly so marked with the word "closed" or its French equivalent "bouchée." Wagner indicates closed notes, thus:—



80. It has been needful to enter in considerable detail into the mechanism of the horn, because there is no instrument in the orchestra for which students are apt to write so injudiciously, unless they clearly understand its nature. As a solo instrument the horn is of a noble, rather melancholy or dreamy character; and, altogether apart from any questions of difficulty, sustained melodies are the most effective. (See Ex. 20). A fine example of a horn solo, but too long for quotation, will be found in the opening of the notturno in Mendelssohn's music to the "Midsummer Night's Dream." The horn may also be employed in more lively passages; we may mention the horn solo in the scherzo of the "Pastoral" Symphony, and the trio for three horns in the "Eroica;" while it is sometimes used also for hunting strains, *e.g.*:—

Ex. 36.

HAYDN. "The Seasons."

Vivace.

Oboi.

Corni in E♭.

Chorus. (Tenor & Bass *unison.*)

Ha - la - - - - - - - - li!

* Schumann, when he uses four horns, frequently has two natural and two ventil-horns. (See the scores of his Symphonies in E flat and D minor.) Wagner in his "Fliegende Holländer" and "Tannhäuser" does the same; in his later works he uses ventil-horns exclusively.

Here the horns are doubled by the oboes in the octave, a not infrequent combination. In all the instances referred to it will be seen that the horns are in one or other of those mentioned (Sect. 76) as their best keys; it is rarely that an important passage for them is found in others. If it be, the probability is that the player will use one of the most favourable crooks and transpose the passage.

81. It has been said above that, when four horns are employed, it is customary to write one pair in each key. In the example (37) given below it will be seen that three are in the key of the piece and one in that of the dominant. The reason will be found in the harmony, in which tonic chords largely predominate. The fourth horn part illustrates what has been said as to the use of the F clef for the lower notes:—

Ex. 37.

Allegretto molto moderato. MEYERBEER. "Robert le Diable."

Corni 1, 2 in C. *dolce.*

Corno 3 in G. *dolce.*

Corno 4 in C. *dolce.*

The well-known passage for four horns in the introduction of the overture to the "Freischütz" may also be recommended to the student for analysis.

82. Where there are only two horns in the orchestra, and a somewhat similar combination is wanted, the bassoons blend sufficiently well with the horns to make an effective substitute:—

Ex. 38.

Andante con moto. SCHUBERT. Symphony in B minor.

Fagotti. *pp*

Corni in E. *pp*

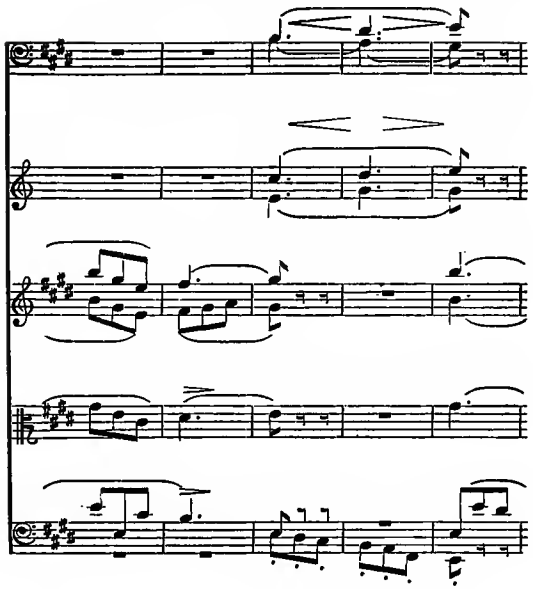
Violino 1. *pp*

Violino 2.

Viola. *pp*

Violoncello. *pp* *Vc. arco.* *pp*

Contrabasso. *Cb. pizz.*



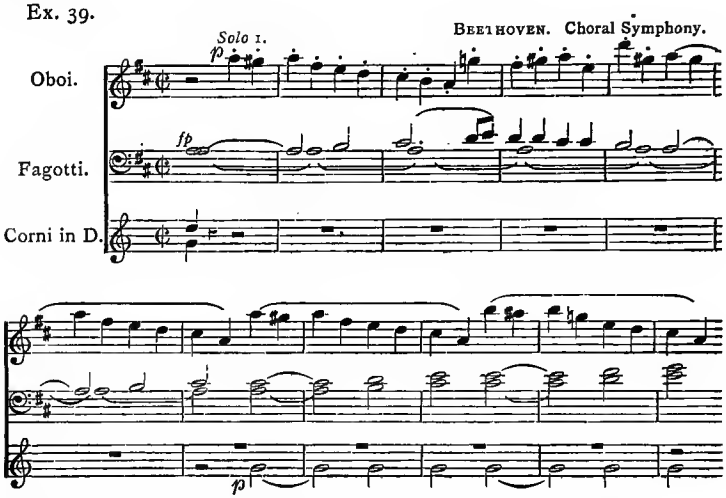
Owing to this power of assimilation in the quality of tone of the horn and bassoon, the latter is often used to eke out the horns, if one may so speak, by completing the harmony with notes which are not on the horn. In the continuation of the passage from "Robert le Diable," quoted above (Ex. 37), the bassoon is used in this manner.

83. When combined with other orchestral instruments, horns are employed to fill up the harmony, use being made chiefly of their open notes. They blend no less well with clarinets, and even with the lower notes of flutes, than with bassoons; while they are frequently employed in their lower notes to reinforce the basses on the tonic or dominant, as in the beginning of the finale of Haydn's Symphony in D (No. 2, Breitkopf and Härtel's edition).

84. It is quite impossible to indicate all or nearly all the combinations available to the composer with the instruments already met with. We shall conclude this chapter with a few extracts from the works of the great masters, illustrating characteristic points, and must leave the student to discover

others for himself. We shall first take one for wind instruments alone:—

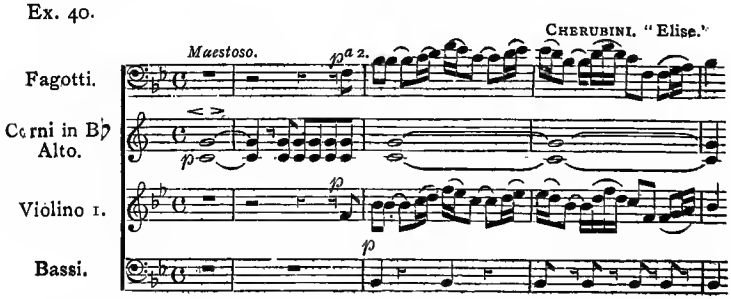
Ex. 39.



This passage has been referred to above (Sect. 57) as an example of the use of the oboe for joyous music. The distance at which the parts are placed causes the chief melody (in the first bassoon), to which the oboe solo is a counterpoint, to be heard distinctly. The student will notice that the limited compass of the natural horn causes its use here to be restricted to the giving the dominant bass.

85. In the following illustration from Cherubini's "Elise"—

Ex. 40.



we find an example of a very thin harmony, in consequence of which the different *timbre* of the various parts is perceived with

more than ordinary clearness. The bassoon is often used, as in this passage, to double the violins in the octave below; but it is generally *one* bassoon, and not (as here) two in unison, to which this duty is allotted. Similarly the oboe frequently (especially in Mozart's scores) doubles the violin in the octave above.

86. Our next example is of a totally different kind:—

Ex. 41.

Allegro. MOZART. Symphony in D.

Oboi.
Fagotti.
Corni in D.
Violino 1.
Violino 2.
Viola.
Bassi.

p *pizz.*

Here the melody is given to the strings, and the accompanying harmonies to the wind. Long holding notes for the horns in the middle of the harmony are frequently to be met with, as here, and are always of good effect.

87. The last illustration we shall give is an excellent specimen of the use of the strings *pizzicato* to accompany a melody played on a wind intrument:—

Ex. 42.

Allegro. AUBER. "Lestocq."

Oboe Solo.

Fagotti.

Corni in D.

Violini 1, 2. (*unis.*) *pizz.*

Viola & Cello. (*unis*). *pizz.*

Contrabasso. *pizz.*

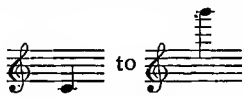
The violins, violas, and violoncellos (the part of this last is in the score on a separate line) are all in unison. Were this passage played with the bow it would probably predominate too much. The student will note here the manner in which the horn is used in a minor key. Closed notes are more frequently needed than in the major mode. It will be seen that the worst closed note (A♭) is reinforced by the first bassoon; the two horns and two bassoons together giving a rich middle part of a fairly homogeneous quality, and preventing the thinness which would be perceptible were the oboe accompanied only by the *pizzicato* of the strings. The student is strongly recommended to analyse for himself passages in the scores of the great composers which he will find to confirm and often also to supplement the instructions given in this chapter.

CHAPTER IV.

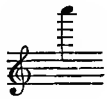
STRINGS, WOOD, AND HORNS.

88. By adding to the oboe and bassoon the flutes and clarinets, we complete the "wood instruments" in ordinary use in the orchestra, and greatly increase the resources at our disposal. We shall adopt the same method as in the last chapter, and speak first of the compass and mechanism of these instruments before treating of their employment in combination with others.

89. The Flute (*Ital.* Flauto; *Fr.* Flûte; *Ger.* Flöte).—This instrument is played without a reed, through a hole pierced in the side of the tube. Hence its old name of "flauto traverso" ("crossways flute"), which may be met with in scores of the last century, to distinguish it from the now obsolete "flûte à bec" or "beak-flute," *i.e.*, flute with a mouthpiece, like the flageolet. The compass of the ordinary flute is from—

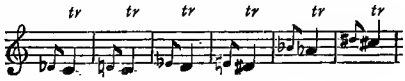


with all the chromatic intervals. The upper C—

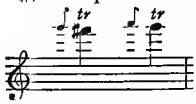


is also a possible note, but uncertain, and should therefore be avoided in orchestral writing; even the B♮ and B♭ in alt. should be sparingly used. The part for the flute is always written in the G clef.

90. The fingering of the flute is similar to, though not identical with, that of the oboe; and the easiest keys for it are those which have not more than three sharps or flats in the signature. Nearly all shakes are practicable on the instrument; those which should be avoided are the following—



and all above the upper C♯, except these two—



91. The lower octave of the flute is sweet, but not very powerful; its upper notes, on the other hand, are of very penetrating quality. For this reason it is mostly employed to give the highest notes in the orchestra; though its low sounds, when judiciously introduced, and not overpowered by other instruments, are very effective. A good instance of the employment of the flute through nearly its entire compass will be seen in the following example:—

Ex. 43. *Allegro moderato.* WEBER. "Jubilee Cantata."

Solo.

Flauto.

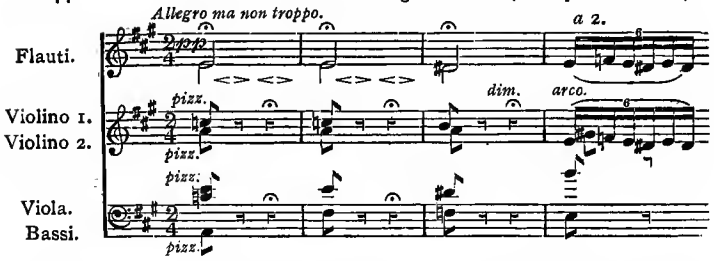
Violini 1, 2.

Viola.

(Bassi.)

The above extract gives an illustration of what was mentioned in Sect. 27, as to the bass of the harmony being given to the violas alone. Our next quotation shows the effect to be be obtained by the lower notes of two flutes in unison:—

Ex. 44. MENDELSSOHN. "Midsummer Night's Dream" ("Ye Spotted Snakes").

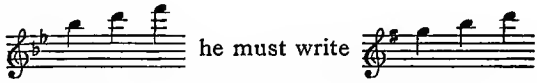


92. Of all the wind instruments used in the orchestra, the flute is the most agile. In favourable keys rapid passages can easily be executed upon it, either *legato* or *staccato*. The *staccato* especially is suitable for it, because of the possibility of what is called "double-tongueing," *i.e.*, a rapid movement of the tongue against the roof of the mouth, as for the quick repetition of the sound of *t*, thus: *t-t-t-t-t*. On reed instruments, as the reed is itself in the mouth, this is impossible; consequently a *staccato* of more than moderate rapidity should be avoided for the oboe, clarinet, or bassoon. A later illustration (see Ex. 56.) will show what is practicable for these instruments. The student will find good examples of rapid solos for the flute in the scherzo of the "Midsummer Night's Dream" music, in the overture to "Guillaume Tell," and in Beethoven's "Leonora" overture, No. 3, all of which he is recommended to examine.

93. Besides the flute already mentioned, other varieties of the instrument, differing from the ordinary flute only in pitch, are in use. Some of these are met with only in military bands, and these therefore we can disregard; but there are two which are employed, the one occasionally and the other frequently, in the orchestra. These are the THIRD FLUTE IN E FLAT, and the PICCOLO.

94. The THIRD FLUTE IN E FLAT is so called because it is in pitch a minor third higher than the ordinary flute, which it resembles in its fingering. The note C is taken as the standard in naming transposing instruments; and as the fingering which on the ordinary flute produces C will on the third flute give E♭, we call this a "Flute in E flat." It is sometimes, though incorrectly, described as a "Third Flute in F;" the explanation of the discrepancy being that whereas the natural scale of the ordinary flute (that is the scale produced by opening in succession the six holes in the tube covered by the fingers) is the scale of D, it will on the third flute, which, as we have said, is a minor third higher, give the scale of F. The term "Flute in E flat" is not only more correct, but also more usual.

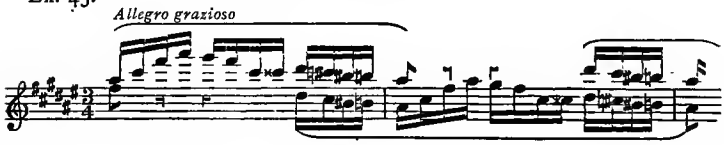
95. The fingering of the third flute being the same as that of the ordinary flute, it is treated as a "transposing instrument," the notes on paper not being those actually sounded. As the instrument transposes a minor third *higher*, the composer must write for it a minor third *lower* than the notes he requires. Thus if he want—



and so on in other cases; being of course always careful to indicate that it is the *third flute* that is to be used. As in some modern scores three ordinary flutes are introduced, the student may meet with "Flauto terzo" when the flute in E flat is not intended. A comparision of the key-signature with that of the other flutes will show at once which is meant.

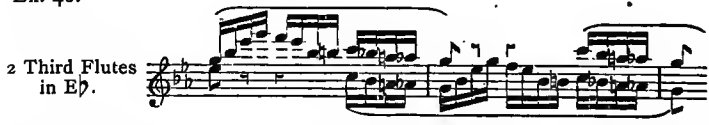
96. The third flute is not often required in the orchestra; it is occasionally used when a passage which the composer wishes to give to the flute would be difficult on the ordinary instrument. In the second part of the "Crusaders," Gade desired to have the following passage played by the flutes:—

Ex. 45.



As F♯ is one of the most difficult keys for the instrument, especially in rather rapid *tempo* (♩ = 116), the execution of this passage, unless by first-rate players, would be uncertain. In his score therefore Gade has employed two Third Flutes, and the passage appears in the following shape, being perfectly easy to play:—

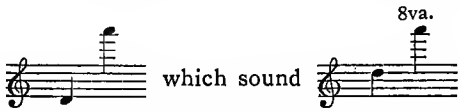
Ex. 46.



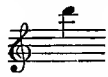
Another instance of the employment of the third flute for solo passages will be seen in the first movement of Spohr's symphony "Die Weihe der Töne."

97. The Piccolo (*Ital.* Ottavino, or Flauto Piccolo; *Fr.* Petite Flûte; *Ger.* Kleine Flöte) is of much more frequent employment

than that just described. It is an octave higher than the ordinary flute (whence its Italian name *Ottavino*). Its compass and fingering are the same as that of the flute (of course transposed an octave), except that piccolos rarely have the additional keys for the low C and C♯. It must also be remembered that the upper notes are not only very shrill, but of extreme difficulty; and the student is advised not to exceed the limits—



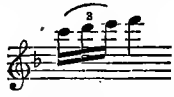
The part of the piccolo is always written an octave lower than its real sound. The notes of the lower octave are weak, and will mostly be better replaced by the second octave of the ordinary flute; the middle and upper notes are more powerful, while those above—



are so piercing that they should be used with great judgment.

98. When the piccolo is introduced into the score it is common only to use one flute, the second flute-player taking the piccolo. This has been done by Rossini throughout the score of his "Guillaume Tell," in which in some movements there are two flutes; in others, one flute and a piccolo. Most second flute-players in our orchestra are accustomed to play the piccolo also. Some composers write for two ordinary flutes as well as a piccolo (*e.g.*, Mendelssohn, "Walpurgis Night;" Auber, "Masaniello;" Meyerbeer, "Les Huguenots"), while occasionally, though very rarely, two piccolos are substituted for two ordinary flutes, as in Gluck's "Iphigénie en Tauride" (Chorus of Scythians), Weber's "Freischütz" (Caspar's Drinking Song).

99. The usual employment of the piccolo is to double the melody in the highest octave of the *tutti;* though it has sometimes an independent part, as for example in certain passages in the finale of Beethoven's C minor Symphony, which the student will do well to examine, or at the end of the overture to "Egmont," where the—



of the piccolo is combined with the fanfares of the trumpets and horns with the happiest effect. The instrument can also be made very useful in *piano* passages, as for example in the com-

mencement of the Turkish March in Beethoven's "Ruins of Athens" where it doubles the first oboe in the upper octave. Owing to its extremely high compass it may be used, as in the example below, to continue a melody which passes above the range of all the other instruments :—

Ex. 47. AUBER. "Le Dieu et la Bayadère."

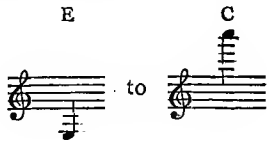
Andantino.

Piccolo.
Flauto.
Oboe. SOLO.
* Clarinetti in B♭. SOLO.
Violino 1, 2.
Viola.
Bassi.

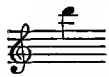
100. The piccolo is an instrument which, if injudiciously treated, easily gives a vulgar character to the music; the student is therefore advised not to use it too freely. For ordinary purposes two flutes will be found far more useful in a score.

* The notation of the Clarinet is explained later (Sects. 103, 104).

101. THE CLARINET.—This instrument, of more recent introduction into the orchestra than any of those hitherto treated of, is the most important and, on the whole, the most useful of all wood instruments. It is played with a single reed, the tone produced by which is much fuller and more mellow than that of the double reed used for the oboe and bassoon. The extreme compass of the instrument is from—

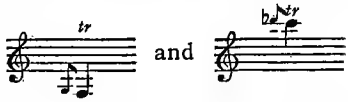


with the complete chromatic scale. The upper notes are not only extremely difficult to produce, but so harsh and piercing as to be practically useless; for orchestral music, it is well not to write above—

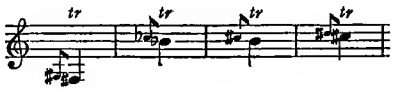


though occasional higher notes may be met with in solo passages in the works of the great masters (see the last note of the trio in the minuet of Beethoven's Eighth Symphony). Music for the clarinet is always written in the G clef.

102. The fingering of the clarinet differs essentially from that of the flute, oboe, and bassoon; and it is well to avoid, at all events in rapid passages, keys which have more than two sharps or flats in the signature. Within these limits, passages founded upon the scale, or the various forms of *arpeggio* (for an example see Sect. 57), are easy and effective. All shakes between—



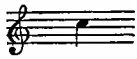
are practicable on the clarinet except the following—



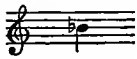
but it will be better to avoid those formed with two sharp or two flat notes, which, though not impossible, are difficult. But any passage written in a key with four or five flats or sharps, unless

it were extremely simple, would be very difficult. Various kinds of clarinets are therefore made, of different pitch, to be used for the various keys. Those ordinarily employed in the orchestra are three—the clarinet in C, in B♭, and in A. There also exists a small clarinet in E♭; but the use of this is almost exclusively confined to military music.*

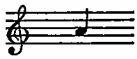
103. The fingering of the various clarinets is precisely the same; but as the length of the tube differs, the actual sound produced by a given fingering varies according to the instrument played. For the clarinet in C the notes are written as they sound, *i.e.*, it is a "non-transposing" instrument; and if the player fingers for—



he will sound that note. On the B♭ clarinet, the same fingering will give him—

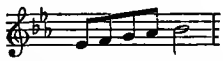


and on the A clarinet—



So also with all other notes. A scale passage—

would on the C clarinet sound as written; on the B♭ clarinet it would be a tone lower—



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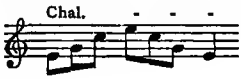
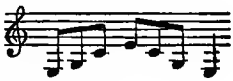
* Small clarinets in D and F are occasionally met with on the Continent, but they are not in use in this country. In the final scene of "Die Walküre" Wagner has employed a clarinet in D. A peculiarity of notation should also be mentioned. A few composers write the lower notes (called "chalumeau" notes) an octave higher than their sound, marking "Chal." thus—

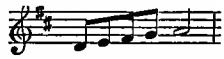


the effect of which will be—



The plan is not to be recommended.

and on the A clarinet a minor third lower—



104. The advantage of the employment of different kinds of clarinets will now be seen. By the choice of a suitable instrument it is always possible, except in extreme keys, to avoid the use of more than two sharps or flats. The following table will make this clear :—

NOTATION.	EFFECT.		
	Clarinet in C.	Clarinet in B flat.	Clarinet in A.
Key, C major	As written.	B♭ major	A major
,, A minor		G minor	F♯ minor
,, G major		F major	E major
,, E minor		D minor	C♯ minor
,, F major		E♭ major	D major
,, D minor		C minor	B minor
,, B♭ major		A♭ major	G major
,, G minor		F minor	E minor
,, D major		C major	B major
,, B minor		A minor	G♯ minor
,, E♭ major		D♭ major	C major
,, C minor		B♭ minor	A minor
,, A major		G major	F♯ major
,, F♯ minor		E minor	D♯ minor

An examination of this table will show the student that in all keys in ordinary use it is possible, by selecting the right clarinet to avoid many flats or sharps. But this is not the only point to be considered. In the key of F, for example, it is possible to write either for a C clarinet, or for that in B♭: which ought to be chosen? So again, in a movement in the key of G, we might take either the C clarinets (writing in G), the B♭ (writing in A), or the A (writing in B♭); and the question presents itself: how are we to decide?

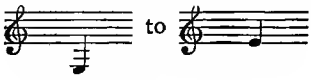
105. This brings us to an important point not yet mentioned—the fact that *each clarinet has its own distinctive quality of tone.* That of the C clarinet, especially in its medium and upper parts, is rather hard and unsympathetic; for which reason some players never use it at all, preferring to transpose music written for it on the B* or A clarinet. The B clarinet is the richest and fullest in tone, and is the one generally selected for solos, though Mozart

* The clarinet in B♭ is often spoken of concisely as the "B clarinet."

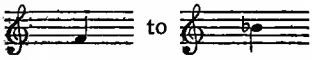
has written both his clarinet quintett and his clarinet concerto for an A clarinet. This last instrument is rather less brilliant than that in B, which in other respects it nearly resembles.

106. If the student, bearing these facts in mind, turns to the table in Sect. 104, he will see that the answer to the question as to the choice of the clarinet will greatly depend upon the nature of the composition; partly also, in a large work, on which instrument has been used in preceding movements. Thus in the finale of Mendelssohn's Concerto in G minor, which is in G major, the B clarinets are used, with three sharps in the signature; not only because, the movement being very brilliant, they are the most suited to it in character, but because they have already been used in the first movement; but in the finale of the same composer's Concerto in D minor, though B clarinets have been employed in the andante, those in A are taken for the key of D major, the slight difference in brilliancy being more than compensated for by the greater ease of execution.*

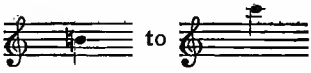
107. The tone of the clarinet varies materially according to the part of the register employed. Its lower ("chalumeau" †) octave from—



is very reedy in quality, and useful both for holding notes, and for arpeggios. For a fine example of the former, let the student examine the introduction of the overture to the "Freischütz," beginning at the twenty-fifth bar; a specimen of the latter will be given presently (Ex. 53). The notes from—



are the weakest on the instrument. Those from—



are full and rich, somewhat like the tones of the flute but more

* It is needful to inform the student that in some of the scores of the older French school, such as those of Cherubini, Méhul, and Spontini, the student will find the clarinets written as non-transposing instruments, the real notes sounded being those written, and the transposition being left to the player. This method is now entirely abandoned.

† See Sect. 102, note.

powerful; while the upper octave is harsh and tearing, and should very rarely be employed.

108. Of all wind instruments, the clarinet is that which possesses the most power of graduating its tone. The *crescendo* and *diminuendo* are much easier than on the flute, oboe, or bassoon; while a good player can produce the most charming effects of *pianissimo*. Again, as a solo instrument the clarinet is capable of the most varied range of expression. This will be seen from the following examples, which have been purposely chosen as being as unlike one another as possible, while each is equally suited to the nature of the instrument:—

Ex. 48. WEBER. Overture, "Oberon."

Allegro con fuoco.

SOLO.

Clarinetto in A.

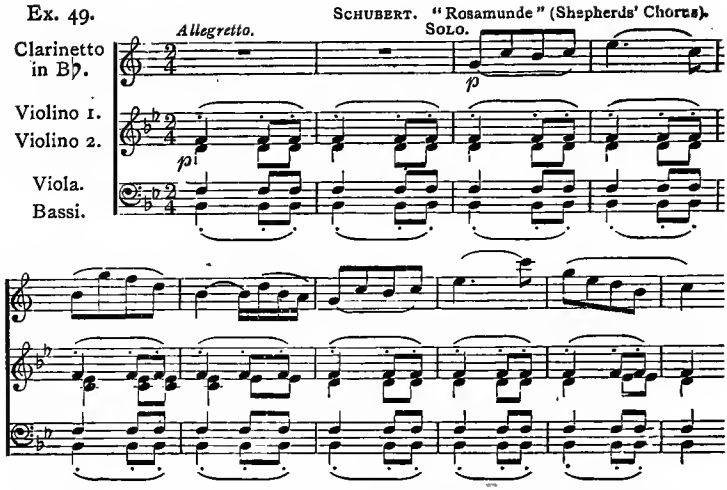
Violino 2.

Viola.

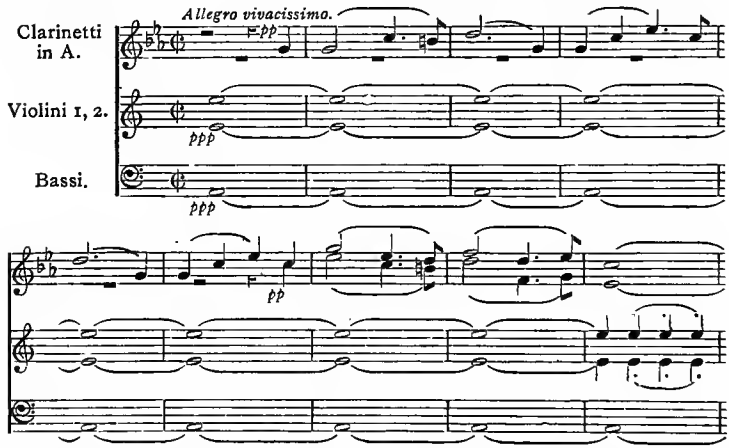
Violoncello e Basso.

Celli.

Ex. 49. SCHUBERT. "Rosamunde" (Shepherds' Chorus).



Ex. 50. MENDELSSOHN. Scotch Symphony (finale).



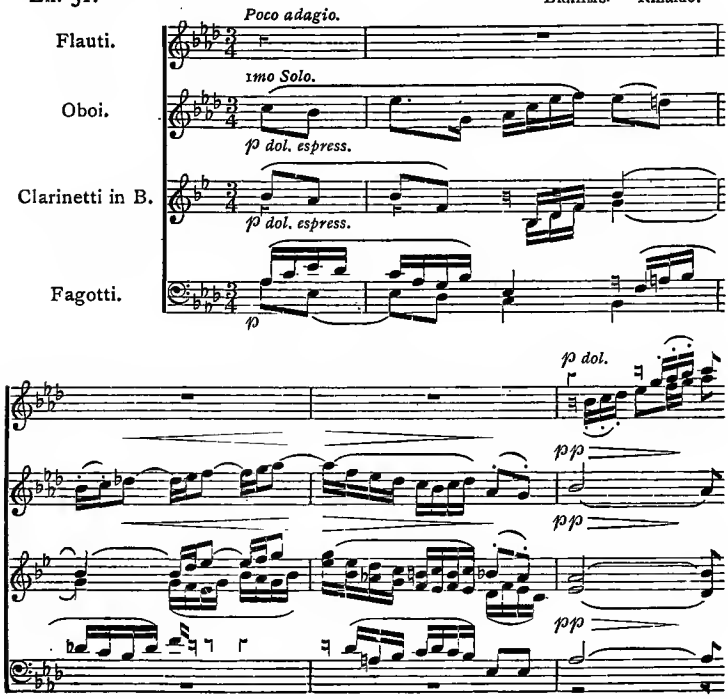
Let the student also compare the solos for the clarinet in the allegro of the overture to the "Freischütz," and in the slow movements of Beethoven's Symphonies in B flat and A major.

109. An orchestra consisting of the instruments with which we have now become acquainted—strings, flutes, oboes, clarinets, bassoons, and horns—is sometimes spoken of as the "small orchestra." With these alone a truly infinite number of combinations is possible; and some of the greatest pieces of music ever

written are scored for no more. As instances of what may be effected, let the student consult Mozart's Symphony in G minor, and the first two movements of Beethoven's "Pastoral." Even in longer vocal works this instrumental force is sometimes found sufficient. Boieldieu, an excellent master of instrumentation, has scored the whole of his opera "Le Nouveau Seigneur du Village" for this small orchestra; and in Mozart's operas, though we find trumpets and drums in the finales and overtures, and occasionally also in a song, yet these are the exceptions, and the smaller instrumental force is the rule. Increase in the number of instruments, and especially in noise, does not always mean increase in effect; and the student should strive to combine a few instruments well, rather than aim at constantly dealing with large masses.

110. We shall now give a few examples of combinations for the small orchestra, showing a few of the resources at the command of the student. The analysis of scores will discover to him countless others. Our first quotation shall be for wind instruments alone:—

Ex. 51. BRAHMS. "Rinaldo."



When the oboe, clarinet, and bassoon are combined, as in the preceding extract, the oboe usually has the upper part, and the middle is taken by the clarinet. This arrangement may, however, be reversed; it will depend upon the effect required. If in the passage just given the melody had been allotted to the clarinet, it would have suited that instrument just as well as the oboe; but had the present clarinet parts been given to oboes they would have had too great prominence.

111. The next quotation we shall give—

Ex. 52. HAYDN. Symphony in G.

Allegro di molto.

Flauto 1.

Fagotto 1.

Viol. 1, 2.

Viola.

Bassi.

requires no detailed notice. It is an example of a procedure very common with Mozart and Haydn: doubling the violin melody by the flute in the upper, and the bassoon in the lower octave. A similar effect may also often be met with where, instead of the violin, the melody in the middle is given to an oboe or clarinet.

112. In the following extracts the horns and bassoons are printed on the same stave to save space; and the horn part is therefore given (to avoid confusion) in the notes actually heard. The student will have no difficulty in writing both horns and bassoons in their proper notation. This passage from Mozart illustrates several points; it gives us an effective solo for the first clarinet, accompanied by a no less effective *arpeggio* on the low notes of the second; we see the flute echoing the clarinet at the fourth and eighth bars, the quality of tone being similar but weaker; while bassoons and horns echo the chords for strings:—

Ex. 53.

MOZART. Symphony in E flat.

Allegretto.

Flauto.

Clarinetti in B.

Fagotti.
Corni in E♭.

Strings.

p

Cor.

Fag.

The whole passage is instructive from its contrasts of colouring.

113. Our next quotation will serve to show how much effect may be produced by the simplest possible means:—

Ex. 54. MÉHUL. "Joseph."

Allegro moderato.

Flauto.

Oboi.

Clarinetti in C.

Fagotti. Corni in C.

Violino 1, 2.

Viola. Bassi.

The whole of the above passage consists of two chords on a pedal bass. It is a simple *decrescendo*. Very few instruments are employed at once, and the score is fuller of bars' rests than of anything else; yet the effect is charming. Let the student examine it closely, and notice how beautifully the changes of colour are managed. The passage well illustrates what was said at the end of Sect. 109.

Ex. 55. MENDELSSOHN. "Lobgesang."

Allegro. Fl. p dim.

Flauti. Oboi. Clarinetti in B. Fagotti. Corni in F. Corni in B♭.* Violini 1, 2. Viola. Bassi.

a 2. p dim. p dim. p dim.

pp Ob. Fl. rit. pp pp pp rit. pp pizz.

114. Ex. 55 presents us with some new combinations. Notice first the effect of the low, reedy notes of two clarinets in unison; then the accompaniment for half a bar of strings and wind

* "Corni in B♭" always signifies B♭ *basso;* if B♭ *alto* is wanted, it is expressly marked. The same remark applies to the horn in B♮. With the horn in A the reverse is the case

alternately; and with respect to the latter, observe how nicely calculated is the mixture of instruments. The low notes of the flutes blend well with the horns, and with the middle notes of the bassoons; but had these last instruments been written lower, the tone being more reedy would not have mixed so well with the flutes, but would have assimilated more with that of the clarinets, and so have obscured the prominence of the melody. Let the student also note the cry of the oboes, written *above* the flutes, instead of (as usual) below them. *Pizzicato* accompaniments to a solo for the wind, as in the last part of this quotation, are always effective.

115. The last example to be given here—

Ex. 56. *Allegro vivace.* MENDELSSOHN. Italian Symphony.

Flauti. *fp*

Clarinetti in A. *fp*

Fagotti. *fp*

Corni in A. *fp*

Viol. 1, 2. *pizz.* *fp* *arco.*

Viola.

Bassi. *pizz.*

sf *p* *arco.*

shows us a melody given to the violins in octaves (compare Ex. 41), and accompanied by iterated chords for the wind. It is probable that Beethoven was the first to discover this combination (see the commencement of the allegretto of his Eighth Symphony); but Mendelssohn has used it more systematically, and, it may be added, with better effect. The student will see that there are no oboes in this quotation. In suppressing them Mendelssohn has shown his usual unerring judgment. The flutes, clarinets, bassoons, and horns form a fairly homogeneous body of tone; but the sharp, cutting notes of the oboe would have at once destroyed the balance. The passage also shows approximately the limit within which repeated notes are practicable for reed instruments (see Sect. 92). We must, in conclusion, repeat what was said at the end of the last chapter. Let the student analyse passages for himself, and let him try to deduce general principles from them, as we have endeavoured to do for him with the extracts just given.

CHAPTER V.

THE FULL ORCHESTRA.

116. Of the three instrumental masses—strings, wood, and brass—which compose a full orchestra, the student is already acquainted with the first and second. He has also learned how to write for the horns, which, from the method of their employment, may be considered as belonging almost as much to the second as to the third group. In the present chapter we shall treat of the remaining brass and the percussion instruments. Those in ordinary use in a modern orchestra are the following:—

(1) Brass	Trumpets.
	(Cornets.)
	Trombones.
	Tuba.
(2) Percussion...	Kettle-Drums (*Timpani*).
	Bass Drum (*Grosse Caisse*).
	Cymbals.
	Triangle.

117. The brass instruments, used as a separate mass or in combination with strings or wood, not only give a new tone-colour to the orchestra, but greatly increase its power. Their frequent employment, unless managed with great judgment, is likely to produce an effect of noise; and there is no department of the orchestra so liable to abuse in the hands of an inexperienced writer. At the same time, if properly and carefully treated, these instruments add a richness to the instrumental mass which can be obtained in no other way. It is therefore of great importance that the student know how to write for them effectively.

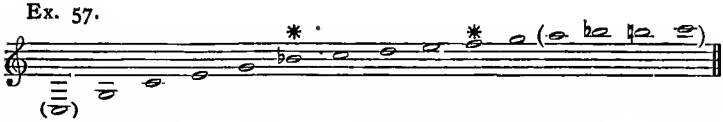
118. The only instruments in ordinary use by Mozart and Haydn of those named in Sect. 116 were trumpets and kettle-drums. Even Beethoven employs the trombones very sparingly. We shall therefore speak first of the trumpets and drums, reserving till later the notice of the trombones and the rest of the percussion instruments.

119. The Trumpet (*Ital.* Tromba;* *Ger.* Trompete; *Fr.* Trompette).—Of this instrument, as of the horn, there are two varieties—the natural, and the chromatic or "ventil-trumpet." In the former the harmonic series of natural notes is produced by

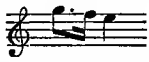
* Or Clarino, a term only found in older scores.

different pressures of wind in the tube of the instrument, that is, by a different embouchure. The scale of natural notes is the same as that of the horn:—

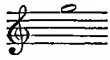
Ex. 57.



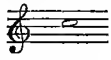
(Compare Ex. 33). Of these notes the lowest C is very rarely used, the quality not being very good. An instance of its employment may be seen at the end of the chorus "O Sinai," in Mendelssohn's "Athalie." The notes marked * are a little out of tune; the B♭ being rather too flat, a fault which must be corrected by a little more force on the part of the player, and which therefore renders it impossible to take the note *piano;* while the F is rather too sharp, and should, on the natural trumpet, only be used as a passing note between E and G:—



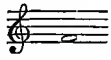
The four last notes of the series are very difficult, and in higher keys absolutely impossible. The student will do well not to write trumpet parts above—



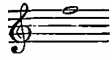
120. The keys in which trumpets can be played are less numerous than those used for the horn. Those generally employed are F, E, E♭, D, C, B♭, and, more rarely, A. Trumpet parts are always written in the key of C,* for the reason given in speaking of the horn (Sect. 67), the real key being indicated at the commencement of the movement, *e.g.*, "Trombe in D," &c. In pitch the trumpet is an octave higher than the horn, except in the keys of B♭ and A which correspond to the B♭ *alto*, and A of the other instrument. Thus the—



of the horn in F gives—



while on the trumpet in F it produces—



* Handel, however, who only uses his trumpets in the keys of C and D, always wrote in his scores the actual sounds produced.

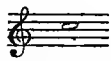
The table of the various keys for the trumpet, with the transpositions effected, is therefore the following:—

Trumpet	in F	transposes	a major 4th	higher.
,,	in E♮	,,	a major 3rd	,,
,,	in E♭	,,	a minor 3rd	,,
,,	in D	,,	a major 2nd	,,
,,	in C	sounds as written.		
,,	in B♭	transposes	a major 2nd	lower.
,,	in A	,,	a minor 3rd	,,

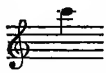
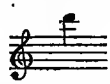
By means of a "lengthening piece" in the tube, it is possible also to have trumpets in D♭ and in B♮ (see Sect. 68), but these keys are not very often used.

121. What was said in Sect. 71 as to the necessity of writing differently for the first and second horns also applies to the trumpets, the method of playing the two instruments being the same, though the embouchure is different. It must not be forgotten that the trumpet has no "closed notes;" the tube being straight, the hand cannot well be inserted in the bell.

122. *Piano* and *pianissimo* passages are possible, and very effective, on the trumpet; but they must not be written high, as the pressure of wind required to produce the upper notes forces the tone, and renders the *piano* impossible. It is seldom that soft notes* are written above—



123. In the scores of Bach and Handel extremely high passages are often given to the trumpet. Bach frequently writes—

 sometimes even 

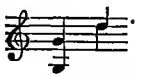
for the first trumpet. With the mouthpieces now in use these passages are impossible; and were one of our players to procure a special mouthpiece which would enable him to play Bach's parts as written, he would lose the power of producing his lower notes.

124. If the trumpets are required in a key for which they have no crook in ordinary use (*e.g.*, G major†), one of the most nearly related keys will generally be chosen. In G major, for instance, we shall most likely find the trumpets in C (Beethoven, Fourth

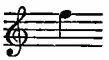
* For a very effective instance of the employment of the trumpet, *pianissimo*, see the slow movement of Schubert's great Symphony in C.

† Some trumpets have a G crook, but it is never used in orchestral music.

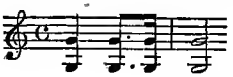
Concerto, finale; Triumphal March in "King Stephen"). This key is chosen in preference to D because it can give both the tonic and dominant of the key—



while on a D trumpet the only G that could be obtained would be –



a note of incorrect intonation. Even for the key of A major the trumpets in D are much more frequently used than those in A, as being of better quality (Beethoven, Symphony in A; Mendelssohn, Italian Symphony). Occasionally for special effects a more remote key is chosen. In the chorus, "Be not afraid," in "Elijah," Mendelssohn writes his trumpets in E for the sake of the passage—

Trombe in E 

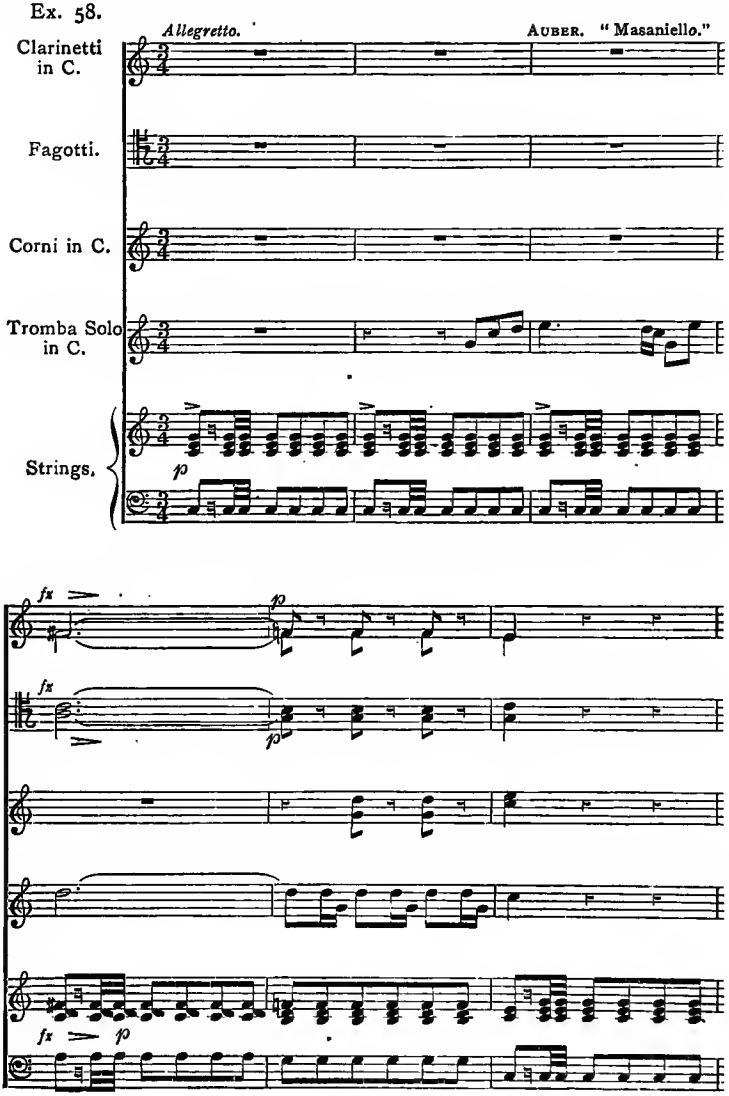
which plays so important a part in the movement.* In minor keys the trumpets are sometimes used in the key of the tonic major (Beethoven, Symphony in C minor, first movement; Choral Symphony, first movement; Mozart, Concerto in D minor); sometimes in the key of the relative major (Schumann, Concerto in A minor; Mendelssohn, Scotch Symphony, finale); sometimes in some nearly related key, *e.g.*, Mendelssohn, A minor Symphony, first movement (*Trombe* in D); ditto, Concerto in G minor, first movement (*Trombe* in D). The student must be guided by the consideration of which notes in the scale he wishes to bring the most into prominence.

125. The tone of the trumpet is very brilliant, and peculiarly penetrating; a single trumpet-note will easily make itself heard through the whole body of strings and wood. The elder masters therefore used these instruments chiefly for rhythmical effects, often for marking the accented parts of the bar. An examination of any of the scores of Haydn, Mozart, or Beethoven will show this at once, though occasionally (as in the slow movement of Beethoven's C minor Symphony and the finale of the Choral Symphony) we find a more important part assigned to the

* See also the finale of Mendelssohn's Concerto in G minor.

trumpets. Modern composers more frequently introduce melodic passages, as in the following example :—

Ex. 58.

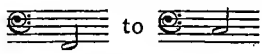


126. The trumpet is frequently used for fanfares, as in the well-known trumpet-call behind the scenes in the "Leonora" overture, in the overture to "Fra Diavolo," and the march in "Tannhäuser," in which three trumpets are employed. The more customary number is two; but three are by no means uncommon (Mendelssohn, overture to "Calm Sea and Prosperous Voyage"; Wedding March in "Midsummer Night's Dream," &c.).

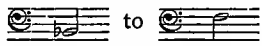
127. The valve- or ventil-trumpet bears to the natural instrument the same relation as the ventil-horn to the hand-horn. The mechanism and action of the valves has already been explained (Sect. 77); it will only be needful to add that the valve-trumpet of course possesses, like the valve-horn, a complete chromatic scale, and that many modern composers write exclusively for these instruments. Some players use a "Slide-Trumpet," which gives the chromatic notes by lengthening the tube of the instrument, in the same manner as with the trombones (see within, Sect. 143.) In writing, no account need be taken of the different varieties of mechanism.*

128. In many orchestras no trumpets are to be found, but the parts written for those instruments are played on the cornet à pistons. As this instrument (see Sect. 172) has a very different and much less noble quality of tone, the change is always to be deprecated.

129. THE KETTLE-DRUMS (*Ital.* Timpani; *Ger.* Pauken; *Fr.* Timbales).—These are not only the most frequently used, but by far the most important of all the percussion instruments.† The kettle-drums are tuned by screws fixed round the rim of the instrument. In an orchestra there are usually two (see Sect. 137), which are of different sizes; the larger one has a compass from—



and the smaller from—



The part of the kettle-drums is always written in the F clef.

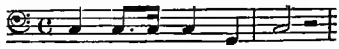
130. It was formerly the custom to write for the kettle-drums always the tonic and dominant of the key of the piece in which they were used, and to treat them as transposing instru-

* In some modern scores (*e.g.*, "Les Huguenots") there are parts for four trumpets, two natural and two chromatic.

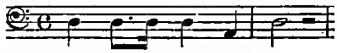
† For an account of the mechanism of kettle-drums, see the interesting paper by Mr. V. de Pontigny in the second volume of the "Proceedings of the Musical Association."

ments, writing invariably the notes C and G, and indicating the tuning at the commencement of the movement, thus—

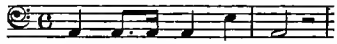
Timpani in D, A.



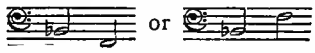
the effect of which would be—



This plan was open to some objections. In the key of A, for instance, as the high A is not on the small drum, the tonic must be taken on the larger one, and in the passage above given, if "Timpani in A, E" were indicated, the notes played would be—

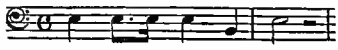


thus the drummer, when the upper note was written, would have to play the lower one, and *vice versâ;* which would be confusing. Again "Timpani in B♭, F," was ambiguous; the player could tune either—



and so also "in F, C." The modern custom therefore is to write the *real sounds;* this is the more necessary because, as will be seen later, the tuning of drums is not now confined to the tonic and dominant. It should be added that no key-signature is generally given for the drums, neither are the flats or sharps marked at all. Thus for drums in E♭, B♭, we should merely write—

Timpani in E♭, B♭.



A few composers, however, always mark the flats or sharps as accidentals.

131. The roll of the drum, which is very frequent and extremely useful, both in *forte* and *piano*, is indicated either by a tremolo—

or, more frequently in modern scores, by a—

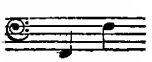
132. The great superiority of the kettle drums to other percussion instruments consists in the fact that they can produce a distinct tone, whereas the big drum, cymbals, triangle, &c., simply mark rhythms. Hence the necessity for indicating clearly which notes are wanted. As a rule, drums should not be used in any chord of which their note is not a component part, not necessarily the bass. Thus, in the following example—

Ex. 59.

if the drums were in C and G, the C drum could be used for any of the chords at (*a*), and the G drum for those at (*b*); but neither could well be used for those at (*c*). In the case of a modulation to the dominant, as at (*d*), the C drum might be used, because it would merely complete the chord of the dominant seventh. Occasionally composers disregard this rule; thus, in the first act of "Guillaume Tell," Rossini has a roll for the drum in B♮, with a chord in D major. If the drum be as well in tune as it should be the effect is not wholly satisfactory.

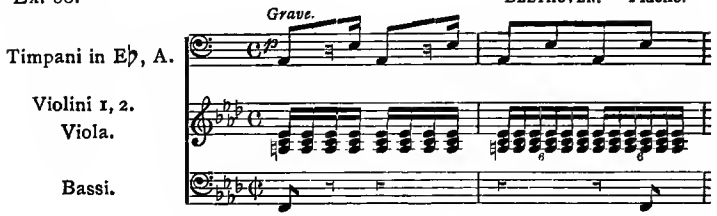
133. The most usual tuning for the drums is in the tonic and dominant of the key; the tonic and subdominant may occasionally be met with—*e.g.*, in the finale of Beethoven's Concerto in G. We shall see directly that by modern composers almost any tuning is used.

134. The older masters rarely employed the drums except as rhythmical instruments, though occasional solo passages for them may be found even in their works—see "The trumpet's loud clangour," in Handel's "Ode for St. Cecilia's Day," and the opening chorus of Bach's "Christmas Oratorio" as examples. Beethoven appears to have been the first to perceive fully the effects of which they are capable; his works are full of characteristic passages for the drums. Let the student examine the slow movement of the Symphony in B flat, the third movement of that in C minor, the finale of the Piano Concerto in E flat, the first movement of the Violin Concerto, or the introduction to the "Mount of Olives." He was also the first to think of tuning drums otherwise than on the tonic and dominant; in the finale of the Eighth Symphony and in the scherzo of the Ninth they are tuned in octaves:—



In the following extract from "Fidelio"—

Ex. 60. BEETHOVEN. "Fidelio."



a very striking effect is produced by their being tuned to the interval of a minor fifth.

135. A specially ingenious tuning for the drums is that employed by Mendelssohn in his "Capriccio," Op. 22, in B minor. Instead of the customary tuning (B and F♯) he puts his drums in D and E.* A moment's thought will show the student that this will give a drum-note for nearly every chord, either in the key of B minor or its relative major.

136. It is often desirable to alter the tuning of one or both drums in the course of a movement. In this case, the composer must remember to allow a sufficient rest for the player to effect the needful change. As an instance, see the chorus "Thanks be to God," in "Elijah."

137. It was said above (Sect. 129) that there are usually two kettle-drums in an orchestra. Many modern composers, however, use three; the earliest instance, probably, being in Weber's overtures to "Peter Schmoll" and the "Ruler of the Spirits." Mendelssohn has three in some of the movements of "St. Paul," and Brahms has also three in his "Schicksalslied." Berlioz, in his "Requiem," has introduced eight pairs of drums, with ten players; and by tuning the instruments in various ways has obtained chords for drums alone. The student will do well to restrict himself to two drums, unless he is sure that three will be at his disposal.

138. It is possible to play both drums at once, though it is not often done. An instance may be seen at the end of the slow movement of Beethoven's Choral Symphony; and Verdi, in the "Lux æterna" of his "Requiem," has a fine effect of a bass solo accompanied by a double roll of the two drums in fifths (B♭ and F) played by two drummers.

---

* It will be seen that with this tuning both drums are above the C given as the highest note for the larger drum. The limits, though given in all the treatises, are not strictly observed in practice; *e.g.*, the upper F♯ is often indicated for the smaller drum in the keys of B and F♯ minor.

139. Our first illustrations of the use of the trumpets and drums will show their employment for chiefly rhythmical effects:

Ex. 61. MOZART. "Zauberflöte."

Allegro maestoso.

Trombe in C.

Timpani in C, G.

In this passage the instruments are entirely unaccompanied; it is merely a flourish, accompanying the entry of Sarastro in the first finale. In the following extract—

Ex. 62. MOZART. Symphony in E flat.

Adagio.

Flauto.
* Clar. in B.

Fagotti.

Corni in E♭.
Trombe in E♭.

Timpani in E♭, B♭.

Viol. 1, 2.

Viola all'8va.

Viola
Bassi.

horns, trumpets, and drums are used to mark the rhythm very strongly. In the older scores we frequently find the horns and trumpets playing in octaves as here. The effect of course is—

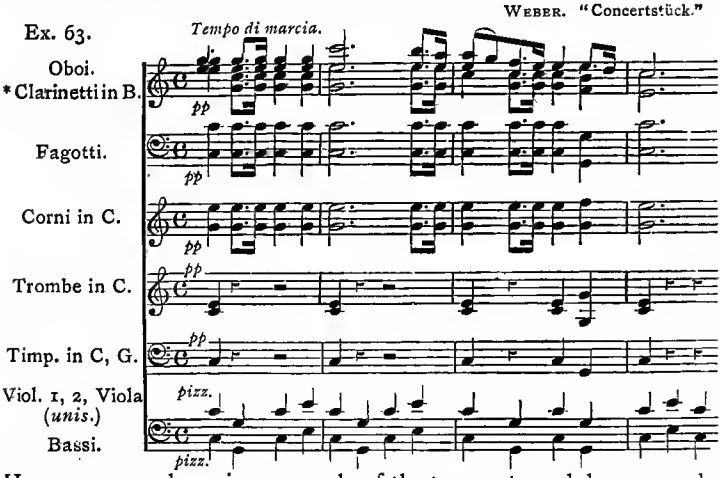
Trombe.

Corni.

* To save space the clarinets are written on the same line with the flute, and with the real notes sounded; in the score they are of course a tone higher.

It will be noticed that in the first half of the second bar the second horn and drum are below the double-basses :—

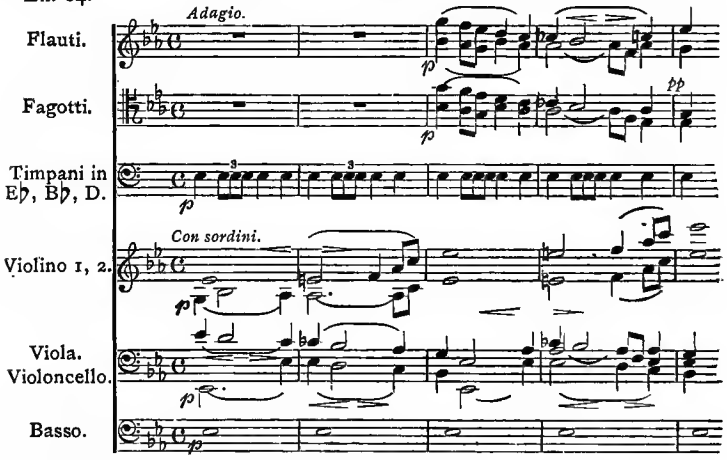
Ex. 63. WEBER. "Concertstück."



Here we see a charming example of the trumpets and drums marking the rhythm *pp*. The quotation requires no further explanation.

The last example to be given here—

Ex. 64. BRAHMS. "Schicksalslied."



shows the admirable effect to be obtained by a *piano* passage for the drum marking a strongly defined rhythm. The passage will

* Transposed from score, giving the notes as sounded.

be well remembered by all who have heard the work from which it is taken.

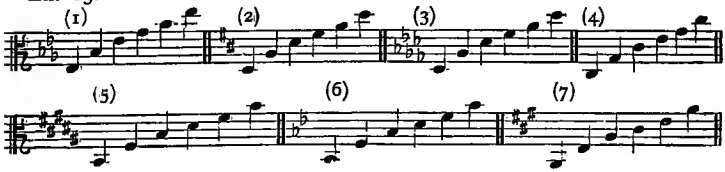
140. THE TROMBONE (*Ger.* Posaune; *Fr.* Trombone).—Though it is only recently that trombones have been generally used in orchestral music, they are by no means newly invented instruments. We find them in the scores of Handel's "Saul" and "Israel in Egypt," while Bach frequently employs them very effectively in his "Church Cantatas." Haydn in his oratorios, and Gluck in his operas (especially in "Alceste"), wrote much for them; while Mozart in "Idomeneo," "Don Giovanni," the "Zauberflöte," and the "Requiem" showed a thorough knowledge of their capabilities. All these masters, however, and even Beethoven himself, used the trombones very sparingly, reserving them for special effects. Weber, Schubert, and Mendelssohn appear to have been among the first who treated them as constituent parts of the ordinary full orchestra.

141. The trombone is a "slide instrument"—that is, its tube is capable of being lengthened at the will of the player, so as to obtain with the same embouchure sounds of a different pitch. The notes to be obtained by difference of embouchure in any one position of the slide form part of the harmonic series already given for the horn (Ex. 33). Those in ordinary use are Nos. 2, 3, 4, 5, 6, and 8. No. 7 being, as already mentioned, out of tune with the tempered scale is not available. Nos. 9 and 10 are possible, but are seldom employed, while the fundamental tone, No. 1 (called a "Pedal"), is still more rarely met with.

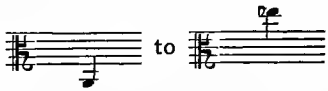
142. Three varieties of the trombone are in use in the modern orchestra, the alto, tenor, and bass. The mechanism and method of playing is the same for all; they differ only in pitch. Formerly a soprano trombone seems to have been known, as we find it indicated in some of Bach's scores. It is now, however, entirely obsolete; and even the alto trombone is not employed in France, though in this country and in Germany it is frequently to be met with in the orchestra.

143. The ALTO TROMBONE is in the key of E♭—*i.e.*, the natural sounds produced by the difference of embouchure *when playing with the slide closed* form part of the harmonic series of that key. By drawing out the slide with the right hand, and thus lengthening the tube, a similar series may be obtained in the keys of D, D♭, C, B♮, B♭, and A. An examination of the following table—

Ex. 65.

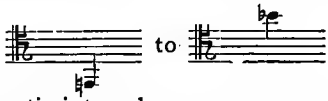


which gives the notes obtainable in the seven positions of the slide, will show that the instrument possesses a complete chromatic scale from—



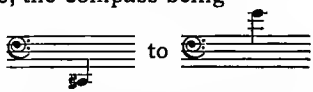
It should be added that the lowest notes are very seldom used, as they can be more easily obtained, and are of a better quality, on the tenor trombone.

144. The Tenor Trombone.—This is the most important member of the family. Its natural pitch is in B♭—a perfect fourth below the alto trombone. All that has been said about the six natural notes, the various positions of the slide, &c., in the last paragraph applies equally to this instrument, *transposing a fourth lower.* The compass of the tenor trombone therefore will be from—

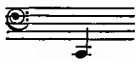


with all the chromatic intervals.

145. The Bass Trombone, unlike the alto and the tenor, is made of various sizes. Some are in G, only a minor third below the tenor trombone, the compass being—



others are in F, a tone lower; while they are sometimes found in E♭, an octave below the alto trombone. In some orchestras they are not used at all, a second tenor trombone being employed. In any case the student will do well not to write for the bass trombone below—



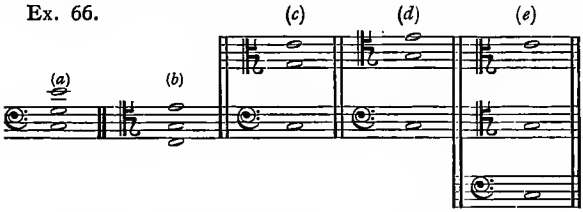
and to use the lower notes very sparingly, as they require much wind, and are very tiring to the player.

146. Three trombones are usually employed in the orchestra: in England and Germany, an alto, a tenor, and a bass; and in France, three tenor trombones. If the student bear this fact in mind he will see the reason for the difference in the treatment of the instruments which he will find in French scores (*e.g.*, those of Auber or Hérold), as compared with those of German masters. Sometimes only two trombones are employed, as in Haydn's "Passione," Beethoven's "Pastoral" Symphony, "Fidelio," &c. Occasionally the bass trombone only is used (Cherubini, "Les Deux Journées;" Weber, "Concertstück;" Bennett, overture,

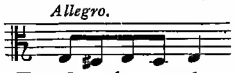
"Die Naiaden"); while still more rarely four trombones are employed (Schumann, "New Year's Song").

147. Unlike the horns and trumpets, the trombones are non-transposing instruments, the notes being always written in their actual pitch. With regard to their notation, several systems are adopted by different composers. Some always write the three parts on one line, using either the tenor or the bass clef indifferently, according to the position of the chords, choosing that which requires the fewest leger-lines; others, again, write the alto and tenor trombone on one stave, using the C clef either on the third or fourth line, and giving the bass trombone a line to itself with the F clef; while many give a separate line to each instrument, and write each with its proper clef. Thus the chord of C major may be found written for three trombones in any of the following ways:—

Ex. 66.



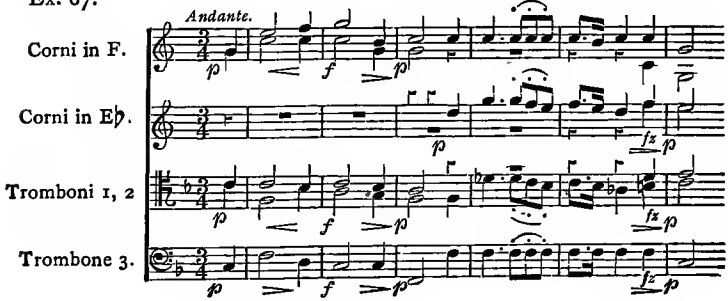
148. Very rapid passages are impossible on the trombones, and, even were they practicable, they would be ineffective. The composer should be careful also to avoid passages necessitating a great change in the position of the slide, *e.g.*, for the alto trombone—



which, by referring to Ex. 65, the student will see requires for every note a rapid change from the first to the seventh position. The tone of the trombone is essentially grand and noble; sonorous and pompous in the *forte*, and particularly rich and full in the *piano* and *pianissimo*, especially when combined with horns to obtain a full harmony for brass alone, as in the following example:—

Ex. 67.

SCHUBERT. Overture, "Fierrabras."



Mozart would appear to have been the first to discover the effect to be obtained from a *piano* accompaniment of trombones for the voice, as may be seen from Sarastro's song, "O Isis and Osiris," in the second act of the "Zauberflöte." Modern composers have frequently employed them in an equally felicitous manner. One illustration will suffice :—

Ex. 68. MENDELSSOHN. "St. Paul."

Allegro maestoso.

Trombe in D. *p*

Tromboni (Alto e Tenore). *p*

Trombone (Basso). *p*

Bass Solo. And my mouth shall show forth Thy glor ious

Strings. *Bassi.* *p*

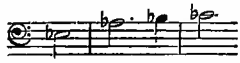
ritard. *ritard.* *ritard.*

praise, and my mouth shall show forth Thy glor - ious

ritard.

No composer has made more charming use of the softer effects of the trombones than Schubert. Every musician will remember the beautiful passage in the first movement of the great Symphony in C (too long for quotation here), where the three

trombones in unison play a melody in the tenor octave *pp*, commencing—



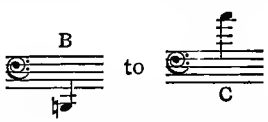
The score of the same composer's Mass in E flat is also especially worthy of study for the treatment of these instruments.

149. Instances of the employment of the three trombones *forte* in full harmony may be met with in nearly any modern score. Indeed, the general tendency of the present day is to use them far too frequently. It may be laid down as a safe general rule that the effect produced by the trombones will be in inverse proportion to the frequency of their introduction into the score. Even in full passages they should be employed sparingly and with great discretion, both because of their power, and because the constant predominance of this tone-colour gives a coarseness and vulgarity to the orchestra, and soon becomes wearisome to the hearers.

150. The trombone is but seldom employed as a solo instrument. A fine instance of its use may be seen in the "Tuba mirum" of Mozart's "Requiem." The passage is given in the old edition of the published score to the bassoon, and in modern performances is usually played by that instrument. It was nevertheless originally written for the trombone, and the change was made simply because no player could be found at that time to perform it. The trombone-players of the present day would manage it with comparative ease.

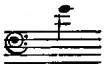
151. There are still two other brass instruments to be noticed, which, though not met with in the scores of Haydn, Mozart, or Beethoven, have been frequently employed by modern composers. These are the Ophicleide and the Bass-Tuba. As they are even now by no means universally to be found in modern orchestras, the student is not advised to write for them; but, for the sake of completeness, a few words about them will be said in this place.

152. THE OPHICLEIDE.—This instrument is in reality the bass of the military bugle, which is not used in ordinary orchestras. There exist two varieties—the ophicleide in C and that in B♭.* The compass of the former is chromatically from—



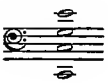
* Alto and double-bass ophicleides are also occasionally to be found in military bands, but are never used in the orchestra.

but the notes above—



are so difficult that they should not be used in orchestral music. The ophicleide in B♭ is a tone lower than that in C. The latter is sometimes (but not always) written for as a transposing instrument; the general practice is to write the real notes desired. The part of the ophicleide is always written in the F clef.

153. The tone of the ophicleide is so powerful that the instrument has been aptly described by an anonymous German writer as a "chromatic bullock." For special dramatic effects it may be exceedingly useful, as the student may see from an examination of the overture to the "Midsummer Night's Dream," in which it has an important part; but it blends so imperfectly with the rest of the family of brass instruments that it is now very generally replaced by the tuba. When it is used, it frequently either doubles the bass trombone in the unison, or the octave below, or else makes a four-part harmony with the three trombones. The ophicleide part is frequently written on the same stave with the bass trombone; occasionally the three trombones and ophicleide are all written on one stave, thus—



in which case it is always understood that the ophicleide takes the lowest notes, unless the contrary be expressly marked.*

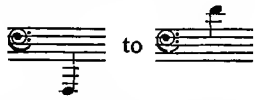
154. The Bass-Tuba.—This instrument, which in modern orchestras has almost superseded the ophicleide, not only possesses the advantage of a more extensive compass downwards,

---

* For a good example of an ophicleide part, let the student examine the score of Mendelssohn's "Elijah." He will notice that though the part is written as sounded, the note—

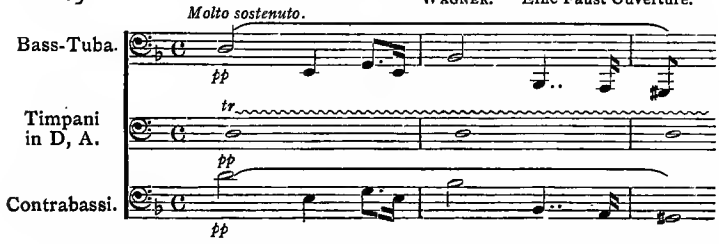
which is only obtainable on the ophicleide in B♭, is more than once introduced.

but is of a quality which blends far better with other instruments. For orchestral purposes it has a chromatic compass from—



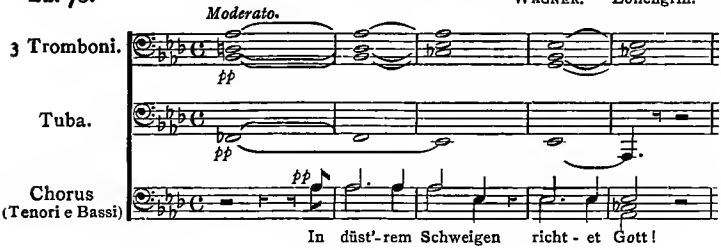
and, though a few more notes are possible at each end of the scale, it will be well to avoid them, as the lower notes are very slow of speech, and the upper ones difficult and uncertain. The bass-tuba (often called simply the "Tuba") is written as a non-transposing instrument, and in the F clef. It is occasionally treated as a solo instrument, as in the following example—

Ex. 69. WAGNER. "Eine Faust Ouverture."



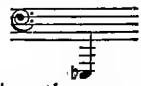
in which the low notes of the tuba in unison with the double-basses are of excellent effect; but it is more frequently combined with the trombones, to form a four-part harmony:—

Ex. 70. WAGNER. "Lohengrin."



155. After what has been said as to other bass instruments, it is perhaps hardly needful to add that rapid passages should be carefully avoided both for the ophicleide and the tuba, especially in the lower part of their compass. Wagner, in the second act of "Die Walküre," has obtained some magnificent effects from the

sustained extreme low notes of the tuba: he has ventured to write for the instrument as low as—

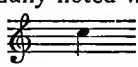


To make such notes effective, they must be judiciously introduced, and plenty of time allowed for the proper emission of the tone.

156. Besides the kettle-drums, other percussion instruments are sometimes employed in modern orchestras, especially in the opera. These are the BASS DRUM (*Fr.* Grosse Caisse; *Ital.* Gran Cassa, or Tamburo Grande; *Ger.* Grosse Trommel), the CYMBALS (*Fr.* Cimbales; *Ital.* Cinelli, or Piatti; *Ger.* Becken), and the TRIANGLE. As these are all merely rhythmical instruments, of no determinate tone, a few words as to their notation is all that will be needful.

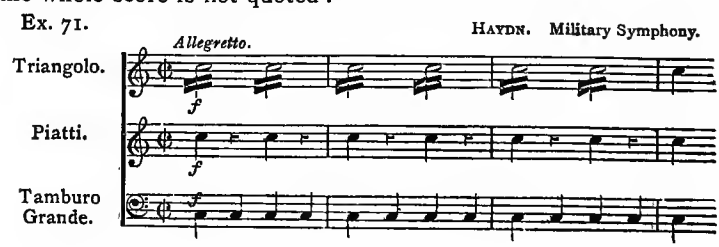
157. The bass drum and cymbals are usually noted on one stave, though sometimes (as in Haydn's Military Symphony and Mozart's "Seraglio") a separate line is given to each. Either the F or the G clef is used, the former being the more common; the note generally, though not always, written is C. If both instruments are on the same stave, and one is to be used alone, this must of course be indicated (*e.g.*, "*G.C. sola*," "*Piatti soli*"). The reason for writing both parts on one line is that one of the cymbals is usually attached to the bass drum, and both instruments are played by the one performer—much (it should be added) to the detriment of the tone of the cymbals.

158. The triangle is usually noted with C in the G clef—



though occasionally the F clef is used for this instrument also. Good examples of the employment of the triangle in *piano* passages may be met with in abundance in modern opera scores; Auber, especially in his overtures, has frequently introduced it with charming effect. The following extract from the allegretto of Haydn's "Military Symphony" will show one method of noting the parts for the percussion instruments. To save space, the whole score is not quoted:—

Ex. 71. HAYDN. Military Symphony.



The part of the bass drum requires a little explanation, as it is not always understood, or even correctly rendered in performance. The instrument is usually struck on one side by a large drumstick; but for this passage two sticks are required. The player takes the large drumstick in his right hand, and a smaller (side-drum) stick in his left. The notes with the stems downwards are to be played with the larger stick, and the others with the smaller one. In modern music only the large stick is employed.*

159. Wagner, in the scores of his "Ring des Nibelungen" has employed the cymbals in several different ways. Besides the ordinary clash of the two together, he obtains peculiar effects by the sharp stroke of a large drumstick on one cymbal, which, being allowed to vibrate, produces a tone somewhat like that of a gong; he also uses the *roll* made on one cymbal with a pair of drumsticks. Such exceptional effects, however, should not be used unless for special dramatic purposes.

160. The student will do well in most compositions to avoid the use of the percussion instruments (excepting, of course, the kettle-drums) entirely. In a symphony they would mostly be utterly out of place. Haydn, in his Military Symphony, already quoted, employs them for a special purpose; but, so far as we know, this is a solitary instance. So with Mozart; in his "Seraglio" he uses them, because they are warranted by the Turkish character of the work; but in none of his symphonies has he employed them. Beethoven introduces them only in the finale of the Choral Symphony, in the climax where all possible voices and instruments are required. If injudiciously used the bass drum and cymbals will give vulgarity, and the triangle triviality, to the music. The present book would have been incomplete without a notice of these instruments; but their use is not recommended to the student in ordinary cases. Let him be content with the orchestra which sufficed for Mozart and Beethoven.

161. Having now shown the compass and employment of all the instruments in ordinary use in the orchestra, we shall conclude this chapter with a charming specimen of a *tutti, piano*, from Auber's "Sirène." Let the student notice the effect of the

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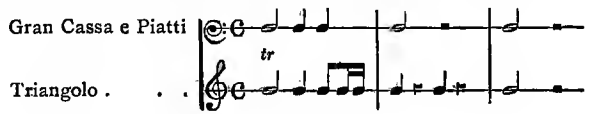
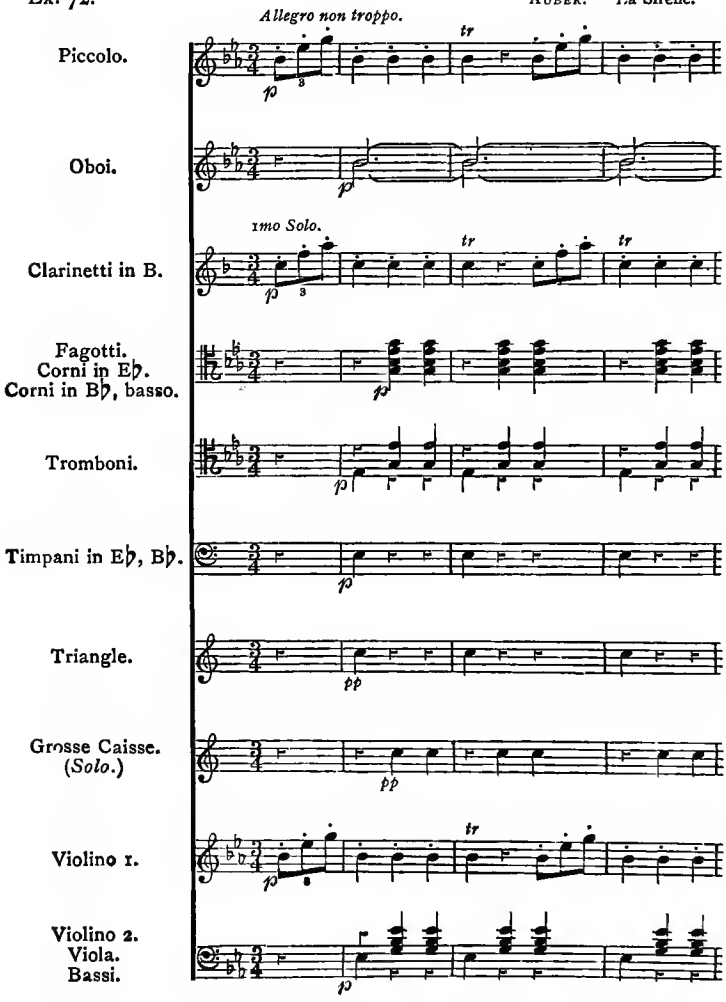
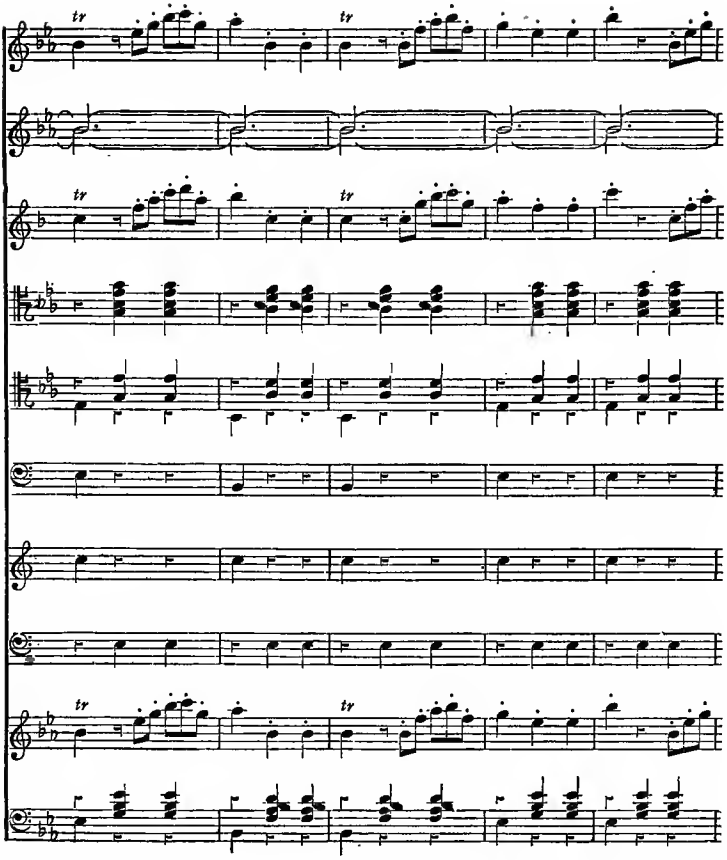
* Sometimes, to save space, the parts for bass drum, cymbals, and triangle are written on single lines instead of on staves, thus:—



holding note for the oboes, the soft chords for the brass, and the employment of the percussion instruments alternately, and especially of the bass drum, *pp*, without cymbals. The whole passage will reward the learner for careful analysis. It will be seen that to save space the score is condensed:—

Ex. 72. AUBER. "La Sirène."

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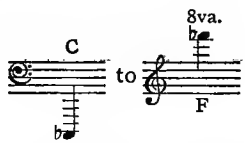
CHAPTER VI.

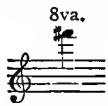
LESS FREQUENTLY USED INSTRUMENTS.

162. The student being now familiar with all the instruments in general use in the modern orchestra, we shall proceed to say a few words on those more rarely employed, but with which he ought to have at least some slight acquaintance—not so much, in many cases, that he may use them himself, as that he may understand their effect when he meets with them in the scores of the great masters. It will be impossible within our limits to do more than briefly indicate their compass and capabilities; for fuller details the reader must refer to the larger works of Berlioz and Gevaert. We shall take these instruments in the same order hitherto adopted, speaking first of strings, then of wood, brass, and percussion.

163. Of stringed instruments to be mentioned in this chapter, by far the most important is the HARP. This instrument has a compass of six octaves and a fourth, from—



but as each string can, by means of pedals, be raised either a semitone or a tone, its real upward compass is to—



It is most important to remember that, by reason of its mechanism, the harp is essentially a *diatonic* instrument. Chromatic passages, whether scales or successions of chords, are mostly impossible, and, even when practicable, ineffective. Simple chords and arpeggios are the most telling on the instrument; and in general terms it may be said that any passage suitable for the piano is also suitable for the harp, with the following limitations:

(1) it must not be chromatic; (2) all extensions above an octave are best avoided in both hands; (3) repeated notes and shakes are ineffective; (4) sudden and remote changes of key are impossible, unless sufficient rests be allowed to give time for the player to alter his pedals. If these points are borne in mind, there will be little difficulty in writing for the harp.

164. The older masters seldom used the harp in orchestral music. We know no examples of it either in Haydn or Mozart,* and even with Beethoven it is only to be found once in the complete collection of his works—in one of the ballet airs in "Prometheus." Modern composers have employed it much more freely; see, for instance, Mendelssohn's "Athalie," "Antigone," and "Œdipus," and the operas of Meyerbeer, Gounod, and Wagner. It combines especially well with the brass instruments, as will be seen by the following:—

Ex. 73.

BRUCH. "Odysseus."

Adagio.

Corni 1, 3, in E.

Corni 2, 4, in E.

3 Tromboni. Tuba.

Timpani in E, B.

Arpa.

Viol. 1, 2.

Viola.

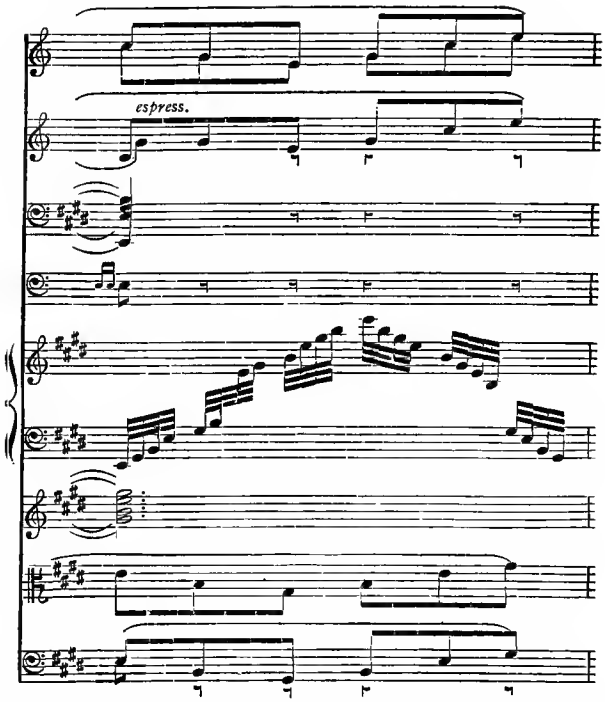
Violoncello. Basso.

(Fag. 1 col Vcello.)

Basso pizz.

* Mozart has written a concerto for flute and harp, but he does not use the instrument in any of his greater operas.

Ex. 73—(*continued*).



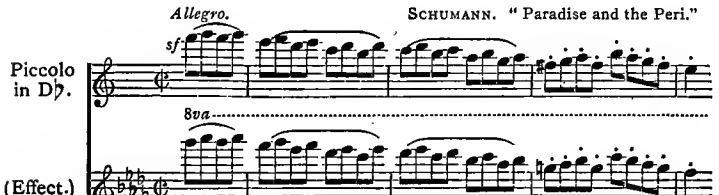
The above example illustrates what has been already said (Sect. 71), as to the difference between first and second horn parts. It will be seen that the third horn is written above the second; this is because it is the *first* horn of the second pair, and therefore the player is accustomed to the high G, which would have been less certain for the second horn.

165. Other stringed instruments occasionally to be met with are the GUITAR and the MANDOLINE. Of the former, Berlioz says that it is almost impossible to write well for it without being a player on the instrument; we therefore advise the student to leave it alone, meanwhile referring him to Berlioz for details as to the best method of treating it. The mandoline (though found in the serenade in "Don Giovanni") is now practically obsolete, and need not detain us.

166. In addition to the various flutes mentioned in Chapter IV, others are to be found in military bands. These are the flute in D♭ and the piccolo in D♭, both of which are often incorrectly

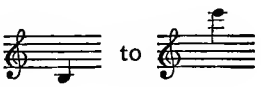
said to be "in E flat" (for an explanation of this inaccuracy, see what was said in Sect. 94 about the "Third Flute"). We mention these flutes here, because Schumann in his "Paradise and the Peri" has used the D♭ piccolo instead of the ordinary one to execute a rapid and rather difficult passage in B♭ minor. A moment's thought will show the student that as on this instrument the fingering for C gives D♭, the passage in question will be written in A minor, a far easier key:—

Ex. 74.

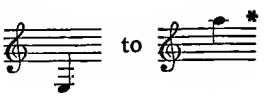


It may be said, in passing, that Schumann has inaccurately marked "Piccolo in E flat" in his score.

167. THE COR ANGLAIS. (*Ital.* Corno Inglese; *Ger.* Englisches Horn).—This beautiful instrument is in reality a larger-sized oboe, with which instrument it is identical in fingering, the pitch being a perfect fifth lower. It is written as a transposing instrument, always a fifth higher than it sounds. Thus its apparent compass from—

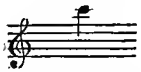


gives the notes from—



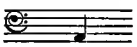
* Some Italian composers (*e.g.*, Rossini, in the overture to "Guillaume Tell") adopt a different notation for this instrument, writing in the F clef an octave lower than the real sounds produced.

The extreme high notes are hardly ever used; it should not be written for above—

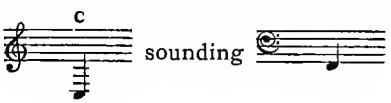


sounding F on the fifth line. The lower notes, on the other hand, are much employed, and are very effective. In tone the cor anglais resembles the oboe, but is less piercing, and more suited for the expression of melancholy. It was frequently used by Bach, under the name of *oboe da caccia*, but seems to have gradually fallen into disuse in the latter part of last century, till it was introduced into several modern operatic scores (Rossini, "Guillaume Tell;" Meyerbeer, "Robert Le Diable," &c.; Halévy, "La Juive"): Wagner, in his "Lohengrin," "Tristan und Isolde," and the "Ring des Nibelungen," has made very effective use of the instrument.

168. The Basset-Horn (*Ital.* Corno di Bassetto) bears the same relation to the C clarinet that the cor anglais does to the oboe, being in fact a clarinet in F. The lowest note on the clarinet being E natural, this would on the basset-horn sound—

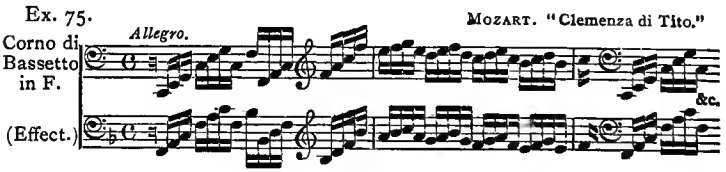


but by means of additional keys, and a prolongation of the tube, the downward compass of the instrument is extended to—



To avoid so many leger lines, the lowest notes (as with the horn) are often written in the F clef, and an octave lower than their proper position (compare Sect. 69), *e.g.*:—

Ex. 75. Mozart. "Clemenza di Tito."

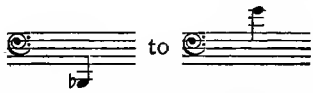


The tone of the basset-horn is richer and mellower than that of the clarinet. Mozart has employed it very effectively in the Priest's music of the "Zauberflöte" and in the "Requiem," while

as a solo instrument he uses it in the air "Non più di fiori" in "La Clemenza di Tito," from which the above passage is quoted. In modern music it is seldom, if ever, to be met with.

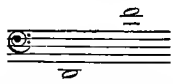
169. THE BASS CLARINET.—This instrument is an octave below the B♭ clarinet, and the part for it is written by most composers in the G clef, a major ninth higher than the sounds produced. Wagner, however, who in his later works uses the instrument very freely, employs both the F and the G clefs, according to the part of the compass used, and writes (as for the B♭ clarinet) only a tone higher than the real notes. He also uses a bass clarinet in A as well as one in B♭. The lowest octave of the instrument is particularly rich and effective in tone; but as its introduction into the orchestra is not yet general, the student is advised to abstain from writing for it. Fine examples of its use may be seen in the score of the "Huguenots" (act v.), and especially in Wagner's "Lohengrin" and the "Ring des Nibelungen."

170. THE SERPENT.—This instrument, now almost entirely disused, is made of wood covered with leather, and played with a mouthpiece like brass instruments. Its compass is from—



a few notes higher are possible, but difficult; its tone is powerful, but coarse, and it is now practically superseded by the ophicleide or bass-tuba. Mendelssohn has written for it in his "St. Paul" and in the "Meeresstille" overture.

171. THE DOUBLE-BASSOON. (*Ital.* Contrafagotto).—This magnificent instrument is in pitch an octave below the ordinary bassoon, to which it bears the same relation as the double-bass to the violoncello. Its part, like that of the double-bass, is written an octave higher than the real sounds. It is well not to exceed the compass—



sounding an octave lower; it must also be remembered that rapid passages are unsuited for the instrument, and that it is almost impossible to produce the lowest notes *piano;* they should be reserved for a *forte.* For doubling the lowest bass notes of the orchestra this instrument is extremely effective. Beethoven has employed it in the finales of his C minor and Choral Symphonies, and in the great Mass in D. Brahms also, in his

"Variations on a Theme by Haydn" and in his Symphony in C minor has treated it with great felicity:—

Ex. 76.

Allegro.
2 Flauti, all. 8va. alta.

BRAHMS. Symphony in C minor.

Oboi.

Clarinetti in B.

Fagotti.

Contrafagotto.

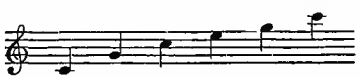
Corni in C.
Trombe in C.

Viol. 1, 2.

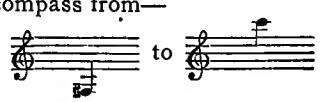
Viola.

Cello e Basso.

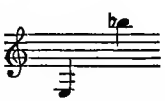
172. THE CORNET-À-PISTONS.—This instrument, which in many orchestras is unfortunately used to replace the trumpets, is in the key of B♭; its natural harmonic series of open notes being—



which, of course, in B♭ sound a tone lower. The mechanism of the pistons (of which there are three) has been already explained (Sect. 77) in speaking of the ventil-horn. The cornet has therefore a chromatic compass from—



giving in B flat—



The cornet has also crooks in A and G, which lower the pitch a

minor third and a perfect fourth respectively, as compared with the notes written. Other crooks also exist, but those mentioned are the only ones in general use.

173. The cornet is far easier to play than the trumpet, which is doubtless one reason why it so frequently replaces the latter instrument. Its tone is, however, much more coarse and vulgar; and it is far more fit for the performance of dance-music, or of solos in operatic selections at promenade concerts than for classical compositions. Rapid passages can be executed upon it with ease; but in dignified and serious music it is entirely out of place.

174. Various other brass instruments are occasionally to be met with in orchestral scores, especially in operas, where a military band is sometimes employed on the stage. Such are the bugle, the various kinds of tubas, alt-horn, tenor-horn, &c., &c. As these are not component parts of an ordinary orchestra, we simply mention them here,* and refer the student who wishes to make their acquaintance to the larger treatises on Orchestration. The same may be said of certain percussion instruments—side-drum, tambourine, gong, &c.—the notation of which is extremely simple, being always on one note; but a knowledge of these instruments will be of little practical use to the student, as the occasions for their appropriate introduction are extremely rare.

175. There yet remains one important instrument to notice—the ORGAN. In instrumental music it is but rarely used, though Sullivan has employed it with excellent effect in his "In Memoriam" overture; and the author of the present work has published a concerto for organ and orchestra. It is, however, in sacred music that the organ is mostly used, and the consideration of its proper treatment will therefore be most suitably deferred till we come to speak of the accompaniment of vocal music. The same may be said of the HARMONIUM, which is often used as a substitute for the organ where the latter is not to be found.

176. In conclusion, it cannot be too earnestly impressed upon the student that the use of all the instruments mentioned in this chapter should be exceptional, and not the rule. One of the surest tests of skilful orchestration is the production of great effects by limited means. Let the learner take the scores of Haydn, Mozart, and Beethoven, rather than those of Meyerbeer and Wagner, for his models. We have quoted from time to time from the latter, to show what can be done; but it must not be inferred that it is always expedient to try to do it. A few notes judiciously introduced will often produce far more effect than a score in which every line is crowded. Too often the result is in inverse proportion to the means employed.

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* Wagner has employed four tubas and a contrabass-tuba in his "Ring des Nibelungen;" but this case is quite exceptional.

CHAPTER VII.

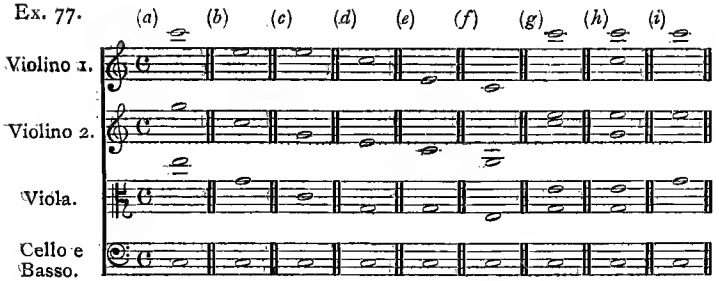
ON BALANCE OF TONE: CONTRAST AND COLOUR.

177. HAVING now made himself familiar with the compass and capabilities of the various orchestral instruments, the student may possibly imagine that he is qualified to begin to write a score. Nothing could be a greater mistake. A musician may have a thorough acquaintance with each separate instrument—nay more, he may even be a good player on them all—without having the slightest idea how to combine them effectively. It is this part of the subject with which we are now about to deal; and here the teacher is met by far greater difficulties than in the preceding parts of the work. It will be readily understood that the *possible* combinations of so many different instruments are absolutely exhaustless; all that can be done here is to lay down a few general rules for the guidance of the learner, and to show, as far as may be, on what principles the acknowledged masters of orchestration have proceeded in writing their scores.

178. There are two mistakes into which beginners are most likely to fall in their first attempts at instrumentation: there will probably either be too much thickness, from the desire to give every instrument something appropriate to do; or the middle parts will be too weak, and the orchestra will sound (to use a homely phrase) "all top and bottom." An understanding of the production of a proper balance of tone will enable the composer to avoid both these faults.

179. One of the most important points to be borne in mind is that the parts of the harmony should generally be *well dispersed*, or at least that the upper parts should not be too far separated from the bass without anything to fill up the gap. For example, the chord of C major may be divided among the whole mass of strings in many different ways:—

Ex. 77.



In this example the disposition of the parts at (*a*) will be very thin, and that at (*b*) only a little less so, owing to the distance between the three upper parts and the bass. The chord (*b*) will be better arranged as at (*c*), while (*d*) will be still more sonorous. At (*e*) and (*f*) we see examples of closer harmony, both of which will sound full and rich, but not brilliant, as the violins and violas must all play (at least in the second case) on their fourth string. To correct (*a*), retaining the upper notes for the first violins, the chords (*g*) or (*h*) may be employed, both of which make use of the "double string" (Sect. 14); and if, for any special reason, only a single note for each instrument is desired, the disposition of the parts as at (*i*) is probably as good a one as can be obtained.

180. We shall now refer the student to some of the extracts quoted from the works of the great masters in preceding chapters, that he may see how carefully this balance of tone of which we are speaking has been attended to throughout. In Ex. 14 he will see that the middle parts, which are close to one another, are about equally distant from the melody and the bass. In Ex. 16 the middle parts, given to the two violas, are so arranged as to produce no effect of thinness; but had Mozart written the second violins in unison with the first, instead of in the octave below, the balance of power would have been destroyed, for the melody would then have been too strong for the accompaniment. Ex. 19 gives us an example of "close position;" while Ex. 21, though only in three-part harmony, is perfectly satisfying to the ear, from the way in which the parts are distributed.

181. In all the examples just referred to strings alone are used; but if we proceed with our analysis we shall find the same general principles illustrated in passages where either the wind is used alone, or the wind and strings are combined. In Ex. 41 the two bassoons would seem to form but a thin accompaniment to the whole mass of violins; but in calculating this the difference of *timbre* must be taken into account. Although the bassoons are playing in their medium register, the notes of which are not very strong, and the passage is also marked *piano*, the penetrating quality of their tone will cause them to be distinctly heard through

the other instruments. The last bars of this same example appear to contradict the general rule given above (Sect. 179) as to the distance between the upper parts and the bass; but it must be remarked, first, that the holding A's of the horns furnish a sort of connecting link, and, secondly, that there are very few rules of orchestration to which there are no exceptions, and that the composer's feeling of the effect he desires must be his guide as to the means he employs. Here it is evident that, after the low harmony for the bassoons, Mozart wishes for a sharply defined contrast. Another instance of the upper parts at a considerable distance from the bass will be seen in the passage from Brahms's Symphony in C minor (Ex. 76).

182. A very important consideration in laying out a score is that the middle parts must not be too thin. The French have a very expressive phrase to describe this: they speak of a rich middle part in the orchestra as being "*bien nourri*"—well nourished. Reference to some of our preceding extracts will make this clear. Ex. 42 is a case in point; but as this has been already remarked upon, we will take others. In Ex. 56, let the student examine the disposition of the wind parts. Here the four-part chord in the upper octave for two flutes and two clarinets is balanced by the chord in the next octave (also in four parts) for two horns and two bassoons: we have compact harmony extending over nearly three octaves. Now, imagine the bassoon parts replaced by two oboes *an octave higher*, and the whole effect of the passage is destroyed. The upper chords become so powerful as to obscure the melody for the violins, and the lower octave is left thin and empty. Look, again, at the beautiful arrangement of the score in Ex. 72. Here, while the first clarinet adds fulness and the piccolo brilliancy to the melody played by the first violins, the soft tones of the horns, bassoons, and trombones impart a peculiar richness to the middle harmony, while the difference of tone-colour is such as in no degree to obscure the principal theme. In Ex. 73, also, it will be seen that the soft chord for the trombones and tuba fills up the middle octave, and removes the effect of thinness which the *arpeggios* of the harp alone would be insufficient to conceal.

183. It would nevertheless be an error to suppose that the middle parts of the harmony must be invariably filled up and enriched as in the passages just referred to. In Ex. 40, for instance, we see a very thin harmony, the middle consisting only of bare fifths for the horns; while in Ex. 50 the melancholy desolate effect of the clarinet solo would be much less striking if the middle harmonies were fuller. On this point we shall have more to say later, in speaking of contrast.

184. We shall now further illustrate the balance of tone of which we are treating by showing several different ways of scoring the common chord of C major. We here give twelve examples of this chord, all *forte*, from the works of twelve of the greatest masters of instrumentation:—

Ex. 78.

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

Flauti. — Fl. Picc. — Fl. — Picc.

Oboi.

Clarinetti in C.

Fagotti. — C. Fag.

Corni in C. — in F. — in C.

Trombe in C.

Tromboni. — Tr. Basso. — Tuba

Timpani in C, G. — tr — tr — tr

Viol. 1. — 8

Viol. 2.

Viola.

Bassi. — Vc. — C.B. — Vc. — C.B. — Vc. — C.B.

(1) Haydn, 2nd Mass.
(2) Mozart, "Clemenza di Tito."
(3) Beethoven, Overture, Op. 115.
(4) Cherubini, "Faniska."
(5) Schubert, Symphony in C.
(6) Weber, "Freischütz."
(7) Mendelssohn, Overture, "Ruy Blas."
(8) Rossini, "Stabat Mater."
(9) Auber, "Masaniello."
(10) Meyerbeer, "Les Huguenots."
(11) Wagner, "Meistersinger."
(12) Brahms, Symphony in C minor.

The student may profitably employ hours in the analysis and comparison of these chords. Did space permit it would be easy

to write several pages on this example; we must content ourselves with indicating to the student the points to which he should specially direct his attention. It should be said, in passing, that to save space the four horns (where four are used) are written on one stave, and the parts, when needful, transposed. Thus in No. 6 there are in the original two horns in G and two in C, in No. 7 two in C and two in E♭, and so on. The examples are given nearly in chronological order, that the student may compare the older with the more modern styles of orchestration. Notice, first, the relative importance given in the various scores to the three notes of the chord—the root, the third, and the fifth; and then observe the distribution of the parts with reference to the comparative strength of tone in the different octaves. It will be seen that in some cases (*e.g.*, Nos. 2, 3, and 11) the effect is especially brilliant, while in others (such as Nos. 6, 7, and 12) it is fuller, richer, and more sonorous.

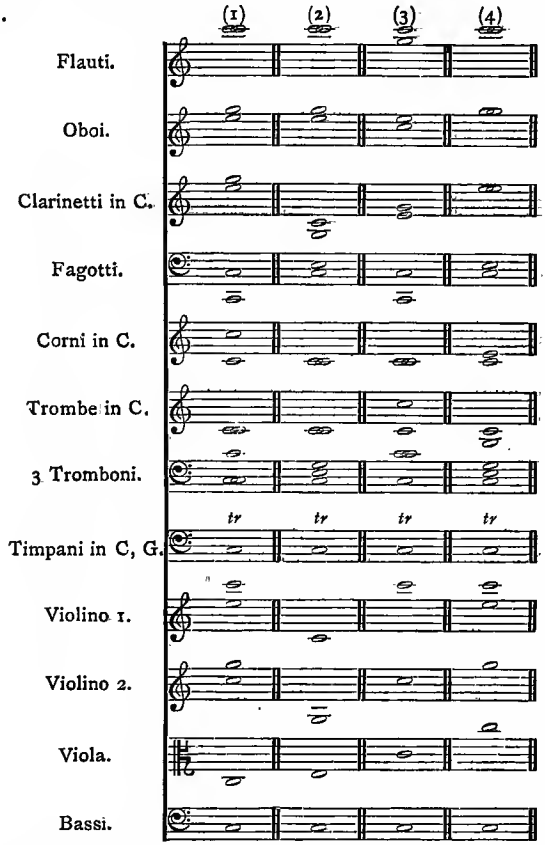
185. All the combinations of tone given in Ex. 78 are effective, though the nature of the effects differs widely in the various chords. We shall now conclude this part of our subject by giving a few examples of the chord of C, which are intentionally scored badly, in order that the learner, by comparing them with those already given, may see not only what to do, but what not to do. (See Ex. 79, p. 111.) These four chords would be all more or less ineffective. Instead of explaining the reasons, we leave the student to discover them, merely saying that they have all been made from the chords given in Ex. 78 by altering some of the parts. If Nos. 1 and 2 of Ex. 79 are compared with Nos. 6 and 8 of Ex. 78, the difference will be apparent at once. In writing these chords, the rules already given for the guidance of the learner have been most scrupulously violated.

186. No less important than a proper balance of tone is the necessity for *contrast* in instrumentation. If either one strength of tone or one uniform colour be too long sustained, the effect will inevitably be monotonous. Moreover, a want of contrast is the more inexcusable as there are so many different ways in which it may be obtained. Among these are (1) the alternation of the three different instrumental masses—strings, wood, and brass; (2) the contrast among themselves of different members of the same group; (3) the sudden change from *forte* to *piano* and from full to thin harmony, and *vice versâ*; (4) the contrast of varying rhythms and figures of accompaniment. We shall give a few illustrations of these different kinds of contrast.

187. Many of the passages quoted in the preceding chapters of this book will serve as examples of what has just been said. For instance in Exs. 38, 55, and 76 is exemplified the alternation of the various masses, wind and strings answering one another.

Ex. 47 affords an instance of the contrasts to be obtained from different members of the same group—the wood. Ex. 30 presents two kinds of contrast at once—that of the tone of the bassoon as opposed to that of the strings, and that of two entirely different rhythms. Ex. 54 is particularly interesting as an example of contrast. Notice especially the third and following bars; where

Ex. 79.



the melody is given to the oboe (a reedy-toned instrument), the full and round-toned horns have the harmony; but in the following bars the disposition of the parts is reversed, the lower notes having the reedy and the upper the clear tones. For contrasts between different parts of the family of strings, see Ex. 38, where the *pizzicato* of the double-basses is so effectively followed by the sustained notes *col arco* of the other strings.

188. A few more quotations may advantageously be given in illustration of these points:—

Ex. 80. MEYERBEER. "Robert le Diable."

Andante maestoso.

Timp. *tr* *tr* *pp* *f* 3 *Tromboni unis.*

Tutti. *Fl.* *Ob.* *Clar.* *f* *pp* *p Str. pizz.* *pp* *p Str. pizz.* *Fag.*

These opening bars of the prelude to "Robert le Diable" are given in a compressed score, because the orchestration is so clear and simple that a misunderstanding is hardly possible. The passage, it will be seen, shows us contrasts not only between various groups, but between members of the same group (flutes and oboes, answered in the next bar by clarinets and bassoons), and between a unison and thin and full harmony; and we also see the effect (in bar 7) of a strongly marked *forte* for full orchestra followed by a *pianissimo* for only three instruments. It is perhaps almost needless to say that the *pizzicato* passages require the "double string;" the student will easily discover for himself the easiest and most effective mode of dividing the chords among the strings.

189. The following lovely little bit of instrumentation—

Ex. 81. SCHUBERT. Mass in F, "Kyrie."

Larghetto.

Oboi. *pp* *pp*

Clarinetti in C. *pp* *pp*

Fagotti. *pp* *pp*

Corni in F. *pp* *pp*

Viol. 1, 2. *pp* *ppp*

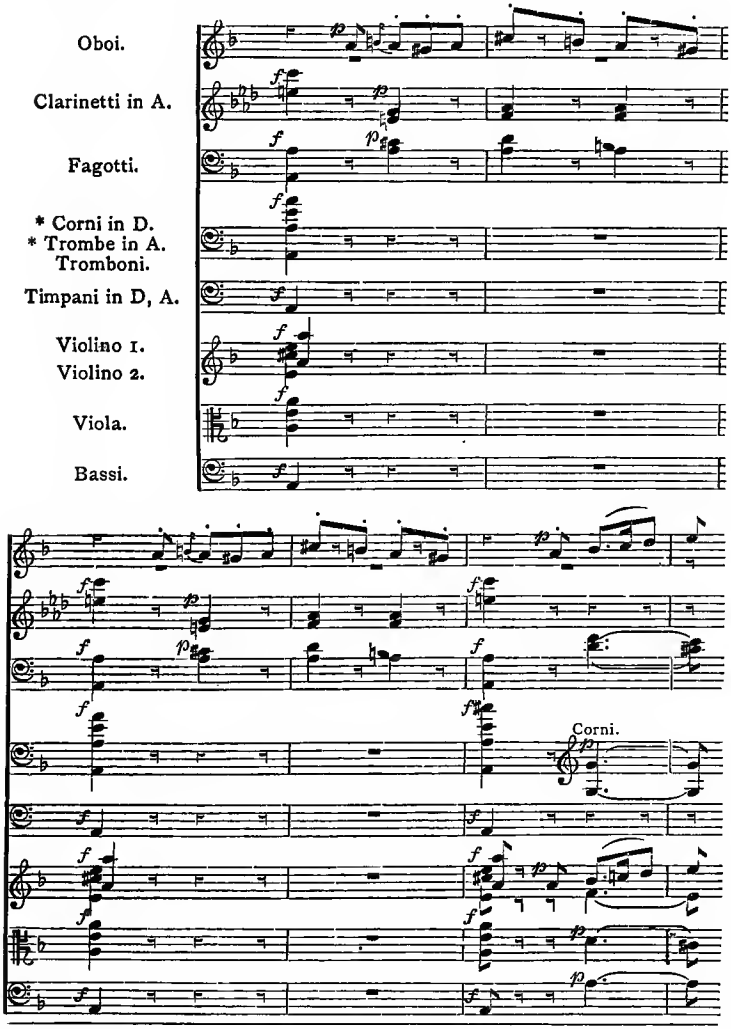
Viola.

Bassi.

hardly requires explanation, but is none the less worthy of study. Let the charming effect of the *sforzando*, *pp*, for the horns and bassoons in the last bar be specially noted.

190. The last example of contrast to be given here—

Ex. 82. GOUNOD. "Funeral March of a Marionette."



* The real notes sounded are printed here on one stave, to save space, excepting the last note for the horns.

illustrates two points. We see first a very decided *forte* for nearly the whole orchestra answered by a *piano* for a few wind instruments; and in the last bars a contrast of an altogether different kind—the *legato* in all the parts succeeding the previous *staccato*. This passage, moreover, furnishes an example of what was said in our introductory chapter (Sect. 5), that many things sound much better in the orchestra than they look in the score. It is difficult for those who have not heard this march played to realise how striking is the effect of the contrast here given.

191. A few words must be said, in concluding this chapter, on orchestral colouring, chiefly because a work on instrumentation in which the subject was not mentioned might reasonably be considered incomplete. Yet this is pre-eminently one of the things the management of which cannot possibly be taught. What his box of colours is to the painter, that the instruments of the orchestra are to the musician; and every great composer, like every great painter, has his own peculiar style of colouring. A musician who is familiar with the works of the great masters would, if shown a score by a composer whose name he did not know, be able, almost with certainty, to fix upon the author from the orchestral colouring. For example, no three styles of instrumentation can be much more unlike than those of Beethoven, Mendelssohn, and Auber—all equally effective in a different way—but while a connoisseur would feel the difference at once, he would probably find it extremely difficult, if not impossible, to define. Every instrument has its own special capabilities of tone and expression, and the combinations are as exhaustless as the possible shades of tint in a picture. It is related of the painter Opie that, being once asked how he mixed his colours, he replied, "With brains, sir!" It is with brains, too, that the student must mix his orchestral colours. To a very large extent the feeling for tone-colour, like melodic invention, is a heaven-born gift, though undoubtedly study will do much to develop it. Let the student analyse for himself the scores of the great masters, let him notice how they produce their effects, and his imagination will be quickened; and if he have within him a natural feeling for colour—and if not he had better not attempt orchestration at all—he will gradually learn, instinctively as it were, to combine his instruments in an effective manner.

CHAPTER VIII.

THE INSTRUMENTATION OF VOCAL MUSIC.

192. In the branch of our subject on which we are now entering we shall have to consider the orchestra in a new light. Hitherto we have regarded it as the principal if not the sole factor in music; but when combined with the human voice it sinks for the most part to a subordinate position. In the present chapter we shall speak of the treatment of the orchestra when used for the purposes of accompaniment.

193. The first and most important principle to be laid down is that when the voice and the orchestra are combined the former is of primary, the latter of secondary, importance. To this rule there are doubtless numerous exceptions, some of which will be presently referred to; but it will nevertheless be probably well within the mark to say that of every twenty bars of vocal music with orchestra in the works of the great masters the voice will be found in at least nineteen to have the prominence. The mistake most often made by beginners is to score vocal music far too heavily. An accompaniment which is so strong as to overpower the voice, or which, even if it does not overpower it, distracts too much the attention of the hearer, is in the large majority of cases an artistic mistake.

194. It has been said above that there are occasional exceptions to this rule. These are, perhaps, most frequent in operatic music. As a very good example let the student examine the commencement of the first duet in "Figaro." Figaro is measuring the walls of his chamber with a foot-rule; the orchestra accompanies with an expressive phrase, while he says to himself from time to time, "Five—ten—twenty!" Here the instruments portray for us his slow steps round the room; the orchestra predominates; but as soon as his conversation with Susanna begins the voice-parts assume their usual importance, and the orchestra becomes subordinate. So again with much descriptive music; the orchestra in the hands of a skilful composer possesses a power of realistic painting with which voices cannot compete, and in such cases the latter sink into a secondary position. The two storm-choruses, "Hark! the deep tremendous voice," in Haydn's "Seasons," and "Woe! see the storm-clouds," in Weber's "Jubilee Cantata," will illustrate this.

195. In the accompaniment of a solo two points should specially be borne in mind—*clearness* and *contrast*. If the orchestral part is either too heavy or too elaborate the singer will not be distinctly heard, while contrast can be obtained either by the difference of tone-quality between the voice and the instruments, or by variety in the rhythms and figures of the accompaniment, or by both combined. For instance, in Ex. 7 the contrast is merely one of tone-colour—the accompaniment is mostly homophonic with the voice; but in Ex. 8, scored also for violas and violoncellos, we see the further contrast between the continuous melody for the voice and the detached chords of the orchestra. Again, in Ex. 23 the duet between the voice and the violoncellos gives us a contrast in tone, while the moving figure of quavers for the second violins gives, as compared with the voice part, the additional contrast of rhythm.

196. In all the passages just referred to it will be noticed that the voice is accompanied by strings alone. It may be said that in general strings furnish the best accompaniment for a solo voice, not only because it is so easy to subdue their tone, and thus to avoid the risk of overpowering the melody, but also because they form a better contrast than do wind instruments, some of which, especially the clarinet and bassoon, assimilate much more nearly to the voice. For this reason it will be found (though there are of course many exceptions) that with the great masters the strings have generally had the most important part of the work in the accompaniment of solo music.

197. In the following passage, accompanied by strings only—

Ex. 83. GLUCK. "Iphigénie en Tauride."

Violino 1.
Violino 2.
Viola.
ORESTE.
Voice.
Dans cet objet tou - chant à qui je dois la vi - e, Et
Bassi.

will be seen a good example of what has just been said as to contrast. Three different forms of accompaniment will be seen, none of which resemble the figure of the voice part. The quaver rests on the accented beats of the bar in the first violin part cause the entries of the instruments to be rather more noticeable, without at

the same time making the part so prominent as to interfere with the voice.

198. The *pizzicato* of the strings is especially useful as an accompaniment when it is desired that the voice part shall be more than usually prominent. Examples may be found in nearly every modern score. We shall give one already referred to in an earlier chapter (Sect. 46), not only because it is one which the student is hardly likely to have seen, but also because it is rarely that we find the *pizzicato* employed as an accompaniment in such rapid *tempo* as here :—

Ex. 84. AUBER. "Le Domino Noir."

Allegretto.

Violino 1. *pizz.* *fp*

Violino 2. *pizz.*

Viola. *pizz.*

Voice. ANGÈLE.

Ah quel - le nuit! le moin-dre bruit me trou-ble et

Bassi. *pizz.*

m'in-ter - dit, . . . et je m'ar-rête, hé - las, . . . à cha-que pas.

199. An excellent effect is sometimes to be obtained by a duet for the voice and one instrumental part, as in the following well-known passage from "Elijah":—

Ex. 85. MENDELSSOHN. "Elijah."

Violino 1, 2.
Viola.
Voice.
Violoncello.
Basso.

Adagio.
ELIJAH. *cres.* *dim.*
I am not bet ter, I am not bet ter than my
dim.
p *cres.*
fa - thers.
sf *cres.*
p

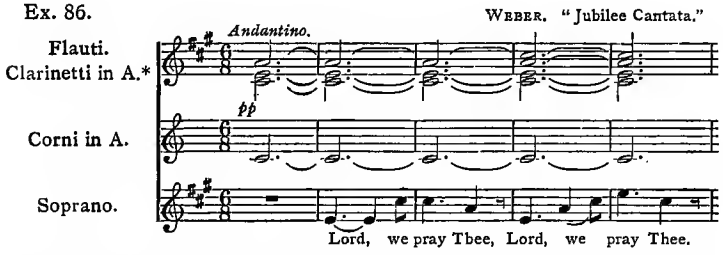
Sometimes a wind instrument is similarly combined with the voice, as, for instance, the oboe (in the air, "Oh, how pleasing to the senses," from Haydn's "Seasons"), the clarinet ("Parto," in "La Clemenza di Tito"), the cor anglais ("Robert, toi que j'aime," in "Robert le Diable"), the corno di bassetto ("Non più di fiori," in "La Clemenza di Tito), or even the trumpet (as in Handel's "Let the bright seraphim" and "The trumpet shall sound").

200. It will be well to remember that as a general rule the accompaniment should be below rather than above the voice part, so as not to obscure it. Not unfrequently the upper instrumental

part is in unison with the voice; but in many passages it will be found better not to double the melody with any instrument whatever, or at least not in the same octave. The two passages last quoted (Exs. 84, 85) illustrate this point. It is important to remember, in applying this rule, that no account need be taken of the difference between male and female voices; the great composers mostly accompany a tenor or bass solo in the same manner (as regards *pitch*) as a soprano or contralto. If, however, the two kinds of voices are combined (*e.g.*, in a duet for soprano and tenor), the difference of the octave in the two registers must not be disregarded.

201. Although, as has been said above, the most important part of the accompaniment to a solo voice is generally given to strings, it by no means follows that the wind may not be occasionally used for the same purpose with excellent effect. It will be well, however, to bear in mind, first, that the tone of the wind instruments sooner becomes wearisome to the hearer than that of the strings; secondly, that it assimilates more to the quality of the voice, and that therefore special care must be taken as to contrast; and lastly, that, being much more powerful than strings, wind instruments are likely to overwhelm the voice, unless used with great judgment. Two examples will suffice to illustrate these points:—

Ex. 86. WEBER. "Jubilee Cantata."



Here we have the voice accompanied by a sustained chord for only a few instruments *pp*, through which the melody can be heard without difficulty. It will be noticed that the accompaniment is at times above the voice part, furnishing another example of what has already been more than once said—that there are few rules of orchestration to which there may not be found exceptions, more or less frequent, even in the works of the great masters. Here the soft tones of the flute in its lower octave are too weak to obscure the melody at all.

* The real notes are given.

202. Our next example is rather more fully scored than the last :—

Ex. 87. MENDELSSOHN. "Lobgesang."

pp Moderato ma con fuoco.

Flauti.

Oboi.

Clarinetti in B.

Fagotti.

Corni in E♭.

Soprano.

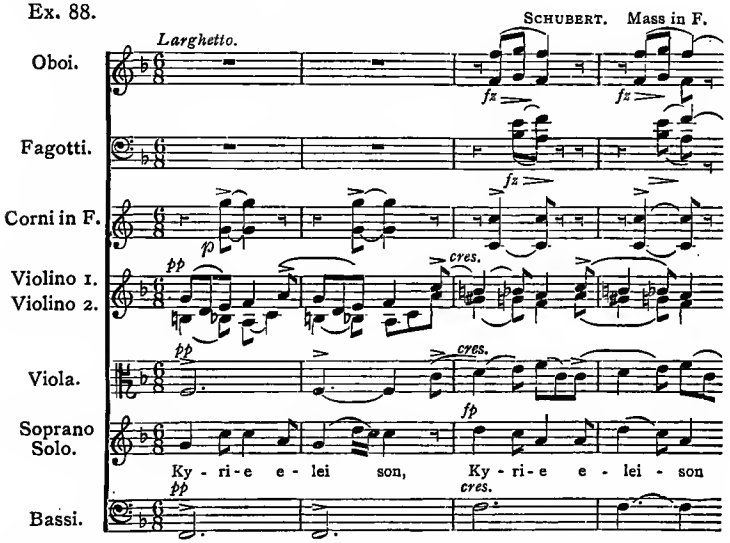
Praise thou the Lord, O my spi - rit, and . . . . my in - most soul, praise His great lov - ing - kind - ness.

We see here a favourite device of Mendelssohn's—the iterated notes for the wind (compare Ex. 56), which in this place make an effective contrast to the sustained melody for the voice. Let the student also notice the balance of tone; the voice is *forte*, and the accompaniment *pianissimo*. In the third and fourth bars the flute is above the voice, and the latter is reinforced by the oboe, so that the melody remains quite prominent enough.

203. Brass instruments may also be used as an accompaniment to a solo voice, though here, even more than with the wood, the utmost discretion in their treatment is necessary. An excellent example will be found in Ex. 68, and modern scores, especially those of Wagner, contain numerous passages which may be consulted with advantage. It may be remarked that the brass is much less often used to accompany a female than a male voice, the latter being less likely to be overpowered.

204. If both wind and strings are used to accompany a solo, it will be better for the wind to be introduced very sparingly, and only for particular effects; if combined continuously with the strings it will be difficult to prevent the accompaniment from being too heavy. The scores of Mozart's operas may be recommended for special study in this respect; but as these are generally accessible, we shall give a quotation from a less-known work. The analysis of the following passage—

Ex. 88.



will well repay the student, for there is not a note introduced without a special object. Mark particularly the beautiful effect of the *sforzando* of the wind on the unaccented parts of the bar.

205. For the accompaniment of recitative the great composers have chiefly employed the strings, either in sustained harmony (sometimes in *tremolo*), or in short detached chords separating the vocal phrases. The wind may also be employed, though the occasions for its appropriate introduction are somewhat rarer.

No fixed rules can be given for the instrumentation of recitative; the student will best learn what to do by consulting the scores of the great masters. Such examples as "E Susanna non vien," in "Figaro;" "Don Ottavio, son morta," in "Don Giovanni;" "Abscheulicher, wo eil'st du hin?" in "Fidelio;" and the whole of the recitatives in "St. Paul" and "Elijah" and in Cherubini's operas may be recommended as excellent models. The old-fashioned unaccompanied recitative (*recitativo secco*) is now almost entirely disused.

206. Modern composers frequently employ the harp in the accompaniment of solo music, especially in opera. If judiciously treated this instrument is capable of great effect, but account must be taken of its somewhat weak tone; and it should not be overpowered by too many other instruments. It may be well used either alone, with the *pizzicato* of the strings (or even with sustained notes of the strings, if very *piano*), or with the softer wind instruments. The scores of Meyerbeer, Rossini, Gounod, and Wagner abound in effective harp accompaniments. A good example of their use in concert-music may be seen in the third part of Schumann's "Faust," in the baritone solo "Hier ist die Aussicht frei."

207. Hitherto we have spoken only of the instrumentation of solos; for the accompaniment of choruses the orchestra requires altogether different treatment. And even with choral music the composer must consider whether he is writing for the stage or the concert-room. If the former the singers may probably be reckoned by tens; if the latter, not infrequently, by hundreds. As the difference in the number of the orchestra will most certainly be by no means proportionate to that of the two choruses spoken of, it is important in writing to calculate the relative proportions of the two. For example, a good opera orchestra will probably number from sixty to seventy performers, and the opera chorus will be possibly as numerous. But a choral society numbering four or five hundred singers would most likely be accompanied by no larger a band; and it will be seen at once that the relative strength of tone between voices and instruments will be widely different in the two cases. And this must be borne in mind by the composer.*

* The general tendency in this country is to have far too numerous a chorus in proportion to the orchestra; hence the latter is, in many cases, completely "swamped," and important instrumental effects are rendered simply inaudible because the chorus is too large. An instance of the prejudicial results of this tendency recently came under the notice of the author. At a concert given by a choral society, in which the band numbered nearly fifty and the chorus about 140, complaints were made by some of the audience that "the band was too loud;" the real fact being that the balance of tone was so much more correct than that to which they were accustomed, that when the orchestra was brought into sufficient prominence, instead of the chorus (as usual) domineering over everything, the conclusion was at once arrived at that such a state of things must be *wrong*. Our overgrown choral societies have misled public taste in this matter.

208. The great point to be remembered in the orchestration of choral music is that *breadth of effect* should be aimed at rather than minuteness of detail. Many things which in the accompaniment to a solo would be charming, will be scarcely heard if the chorus is singing. It is not, of course, intended to imply that the full power of the orchestra should be continually employed; such a procedure would be no less tasteless and absurd than in a symphony. But the composer should in general lay out his accompaniments rather for orchestral masses than for solo instrumental effects. Either of the orchestral groups (strings, wood, and brass) may be used singly or in combination in accompanying the voices; but as a general rule a solo passage (*e.g.*, for flute, oboe, or clarinet) will fail to make itself heard unless the chorus be singing *pianissimo*.

209. In contrapuntal music, especially in fugues, it will be well to pay particular attention to clearness. If there be too much detail the music inevitably suffers. As a general rule, we recommend the student to write the accompaniments to a fugue in the unison or octave with the voices. The great masters, it is true, have produced fine examples of fugue with an independent orchestral accompaniment (*e.g.*, Haydn, "Et vitam venturi," in his First Mass; Mendelssohn, "Behold now, total darkness," in "St. Paul"), but unless a composer has a great command of florid counterpoint he will find this form difficult to treat successfully.

210. In the cases already mentioned, the interest is supposed to be pretty equally divided between the chorus and the orchestra; but cases frequently occur in which it is desired that the voices shall predominate. Nothing produces a finer effect than the introduction, if well managed, of a passage for unaccompanied chorus; while instances may also be often met with in which an accompaniment is given which is entirely subordinate, and merely sufficient to prevent a sinking in pitch. This, by the way, is an important consideration; and the composer will do well not to leave the voices without accompaniment in any passage of difficult or doubtful intonation, otherwise the effect of the re-entry of the orchestra may be disastrous.

211. In sacred music (oratorios, &c.), and even in certain operatic scenes, the organ is often combined with the orchestra for the purposes of accompaniment. We strongly recommend the student not to employ this instrument unless he has some practical knowledge of its capabilities, as he will otherwise probably not write for it suitably; and its tone is so powerful that a badly written organ-part will ruin the effect of his orchestration. Assuming that he understands the instrument sufficiently, a few remarks may be made as to its treatment with the orchestra and chorus.

212. Both Bach and Handel made great use of the organ in their sacred works. The former, so far as can be judged from the indications in his scores, appears to have employed the instrument continuously, and in full harmony almost from the first to the last. Handel, on the other hand (as we know from his own notes on the organ-part to "Saul"*), used the organ to play in unison with the voices in the choruses, and occasionally also to strengthen the bass part (*tasto solo*) in the airs. Haydn and Mozart in their masses mostly employ the organ in all *forte* passages, sometimes dispensing with it in the *piano* and solo parts of the music. In the scores of all these masters the organ-part is not written in full, but simply indicated by a figured bass, the exact position and fulness of the chords being left to the player. Probably the earliest instance of an organ-part fully written out in the score is to be found in Beethoven's Mass in D. The composer has here reserved it for special effects, where either a great volume of sound or a sudden contrast of tone was desired; and his method of treating the organ was followed, perhaps with even more success, by Mendelssohn, whose scores of "St. Paul," "Elijah,"† and the "Lobgesang" are most instructive, and their study is strongly recommended to the student. We shall give one instance from the "Lobgesang" of a most felicitous introduction of the organ in the middle of a phrase :—

Ex. 89.

MENDELSSOHN. "Lobgesang."

‡Corni in B♭.

Allegro di molto.

mf unis.

sf

Violino 1, 2.

mf

Viola.

(2 Oboi *unis. colla voce.*)

Alto (Chorus).

And let flesh . . . . .

Allegro di molto.

Organo.

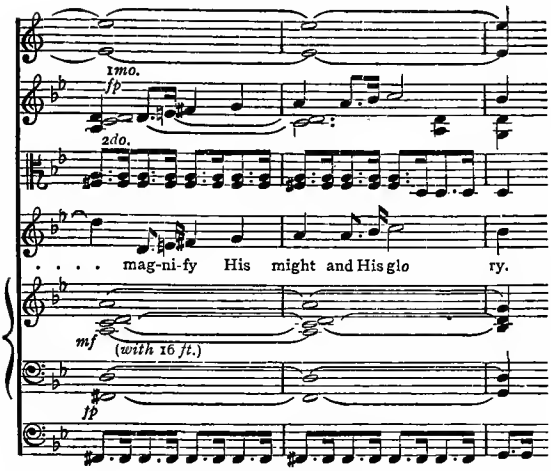
mf

Bassi.

* See Chrysander, "Jahrbücher für Musikalische Wissenschaft," i. 408-428.

† In the original editions of the scores of "St. Paul" and "Elijah" the organ-part is not given in full, but is simply indicated by the words "Col Organo" and "Senza Organo." In the new edition of the complete works of Mendelssohn (Breitkopf and Härtel) the composer's own organ-part appears in its proper place in these scores for the first time.

‡ See note to Ex. 55.



213. To a considerable extent, of course, the effect of the organ in combination with the orchestra will depend upon the manner in which the player "registers." Organs differ so much from one another that it would be impossible for the composer to indicate exactly the stops he desires used; and even were it possible it would be unadvisable, because much must depend upon the size of the chorus and orchestra, the acoustic qualities of the hall, &c. It will be best therefore to give merely general directions, as Mendelssohn has done in the passage just quoted (*f*, *mf*, *p*; 8 feet, 16 and 8 feet, 8 and 4 feet, &c.).

214. The organ is occasionally used for special scenes in operatic music, as, for instance, in the fifth act of "Robert le Diable," the second act of "Lohengrin," &c. It is also exceptionally employed in lighter opera (*opéra comique*), as in the convent scene in the third act of Auber's "Domino Noir." As many theatres do not possess an organ, the part is in such cases usually played on a harmonium. This is at best only a makeshift; for though in softer passages the harmonium may fairly well be substituted for the organ, it is impossible to obtain the round tone of the diapasons from any reed instrument. The harmonium is scarcely ever used in the orchestra excepting in the way just mentioned. An instance of its employment (probably the only one) may, however, be seen in the score of Liszt's oratorio "Christus," in which both the organ and harmonium are used alternately.

215. We have hitherto given no quotations of full choral passages accompanied by the orchestra, partly because, to be of much use, they would be necessarily so long as to occupy more space than it is possible to spare in a small book such as this, and partly also because the learner can so easily obtain cheap editions

of many of the full scores, which will be admirable models for him, that it will suffice to refer him to the works themselves. We specially recommend for study Haydn's "Creation" and Mendelssohn's "St. Paul," "Elijah," "Lobgesang," and "Walpurgis Night," from a careful examination of which he may learn more than it would be possible for us to tell him in fifty pages. The most important point to be considered in the instrumentation of a chorus is the proper balance of tone between the voices and the orchestra. For the sake of completeness, we give, in concluding this chapter, one short passage for chorus, full orchestra, and organ :—

Ex. 90. MENDELSSOHN. "98th Psalm."

Allegro.

Flauti.

Oboi. (Clarinetti in C, col Oboi.)

Fagotti.

Corni in D.

Trombe in D.

3 Tromboni.

Timpani in D, A.

Violino 1.

Violino 2.

Viola.

Soprano.

Alto.

And the peo-ple with truth, and the peo-ple with

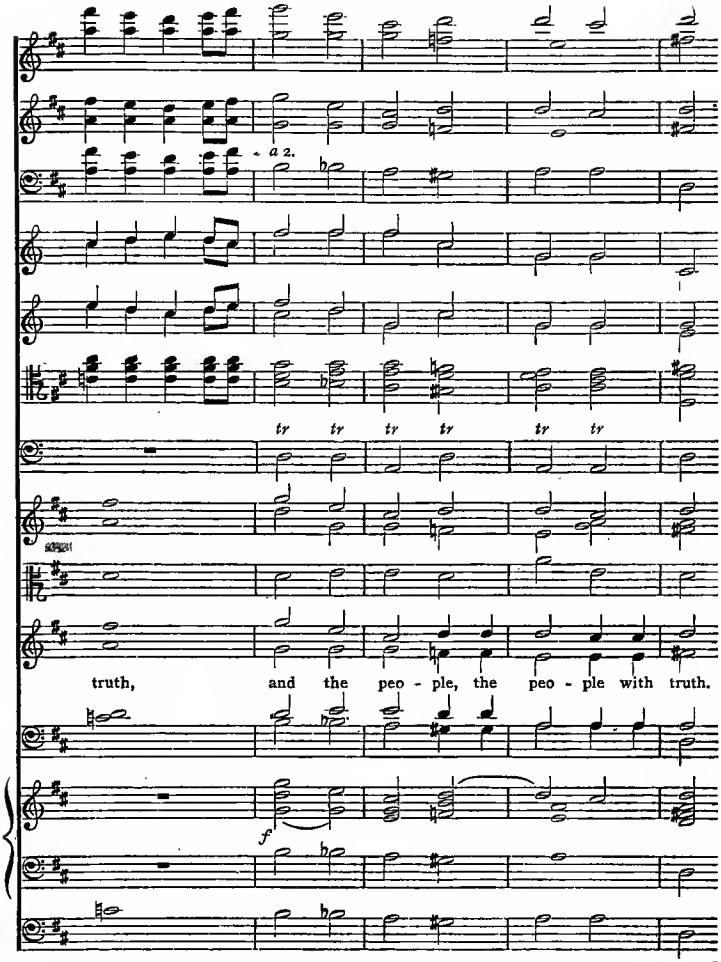
Tenore.

Basso.

Allegro.

Organo.

Bassi.



In this extract we see first the contrast of the various masses, voices and strings being answered by wood and brass, and at the fifth bar the combination of the entire vocal and instrumental force. An analysis of the passage will repay the student.

CHAPTER IX.

THE ORCHESTRATION OF CONCERTOS AND OTHER INSTRUMENTAL SOLOS.

216. THE general principles by which the composer should be guided in orchestrating an instrumental solo being in all cases the same with which the student is already familiar, it will not be needful to do more than to make a few remarks in this chapter on the manner in which these principles should be applied.

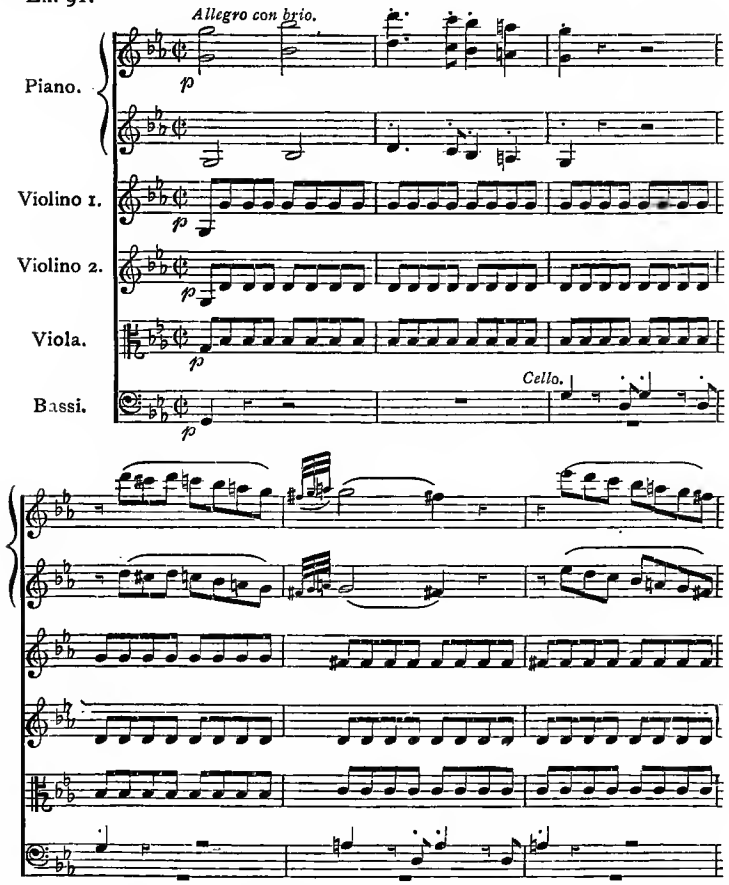
217. In writing for a solo instrument many things are admissible which would be, to say the least, inexpedient in orchestral music. For instance, in a violin concerto there would be no necessity to limit the upward compass of the instrument to A or C (Sect. 12); many passages of double notes and other difficulties are allowable in a piece written to show off a soloist, which no sane musician would think of writing for the orchestra. Hence the necessity, or at least advisability, of the composer's having some practical knowledge of the instrument for which he is writing; without such knowledge he will be very likely to introduce passages which will be as ineffective as they are difficult.

218. Concertos are usually written for one solo instrument, though occasionally more than one is used; thus concertos exist by Mozart for two violins, for violin and viola, and for flute and harp, as well as for two and three pianos; while Beethoven has written a fine triple concerto (Op. 56) for piano, violin, and violoncello. The instrument for which the largest number of concertos has been written is undoubtedly the piano. This probably has largely arisen from the fact that the piano is more generally cultivated than any other instrument, and that for one good solo violinist it would probably be easy to find three or four equally good solo pianists. But another reason for the preference given to this instrument may doubtless be found in the fact that it is capable of producing complete harmony by itself, and that, while not a component of the ordinary orchestra, it contrasts and combines equally well with all other instruments. If the student would learn how to combine the piano with the

orchestra let him examine closely the scores of Beethoven's concertos (especially those in G and E flat) and of his "Choral Fantasia" (Op. 80). Mendelssohn's works for piano and orchestra (concertos, "Capriccio Brillant," &c.) may also be studied with advantage.

219. It is impossible within our limits to enumerate a quarter of the possible combinations of piano and orchestra. We shall content ourselves with giving short quotations, illustrating two or three of the effects most frequently introduced:—

Ex. 91. BEETHOVEN. Concerto in C minor.



Here we have the melody given to the piano in octaves, and

accompanied by simple harmony for strings. In the following passage—

Ex 92. SCHUMANN. Concerto in A minor.

Fagotti.
Piano.
Violino 1.
Violino 2.
Viola.
Violoncello.
Bassi.

p *Ped.* * *Ped.* * *divisi.* *espress.* *Ped.* *

the melody is given to the violoncellos; the other strings and the bassoons fill up the harmony in the first two bars, while the piano has ornamental passages of broken chords. At the third and fourth bars the piano takes the melody, and the strings occupy a subordinate position. Our next illustration—

Ex. 93. MOZART. Concerto in D minor.

Allegro.

Flauto. Fl.

Oboi. Ob.

Fagotti. p

Corni in D. p

Trombe in D. p

Timpani in D, A. p

Allegro.

Piano.

shows how to combine the piano with the wind instruments effectively. The *piano* of the trumpets and drums should be noticed. In a *forte* passage these instruments would overpower the solo part too much.

220. Next to the piano the instrument most frequently used for concertos is the violin. It is hardly needful to say that in the accompaniment of a solo violin the other violins must be used. Here contrast must be obtained less by variety of tone than by differences of rhythm, &c. Occasionally variety of tone also may be employed; thus, in the slow movement of his violin concerto, Beethoven writes all the accompanying violins *con sordini*, while the solo instrument plays without the mute. The scores of the violin concertos of Beethoven and Mendelssohn will show the student how to treat this branch of orchestration. One extract from the latter is given :—

Ex. 94. MENDELSSOHN. Violin Concertn.

Flauti.
Clarinetti in A.
Fagotti.
Violino Principale.
Viol. 1, 2.
Viola.
Bassi.

p *p* *p* *pp legg.* *p* *pizz.* *p* *pizz.*

In this quotation the solo violin is accompanied by a few wind instruments, while the strings have *pizzicato* chords. The contrasts of tone here leave nothing to desire.

221. In the comparatively rare cases in which a concerto is written for a solo wind instrument, it will be well to avoid using another instrument of the same kind in the orchestra. Thus Mozart's and Weber's concertos for the clarinet have no clarinet parts in the accompaniment; in Mozart's concerto for bassoon the only wind instruments are oboes and horns, and so on. The object, of course, is to have as complete a contrast as possible between the solo part and the accompaniment.

222. It need only be added, in conclusion, that if the student be guided by the general principles laid down in Chapter VII, on balance of tone and contrast, and in Chapter VIII, on the accompaniment of solo music, and will study carefully the published scores of the concertos of the great masters, especially Mozart, Beethoven, and Mendelssohn, he will find little difficulty in the suitable and effective orchestration of any concerto that the spirit may move him to write.

CHAPTER X.

GENERAL PRINCIPLES: CONCLUSION.

223. We have now briefly treated each of the branches of instrumentation which come properly within the scope of the present Primer. We shall conclude our work with a few general suggestions to the student.

224. One of the most important pieces of advice to be given to a young musician commencing orchestration is, WRITE PRACTICALLY. A very common mistake with the beginner is to make his music excessively difficult or awkward to play. It is comparatively seldom that such difficulty lies in the nature of the musical idea; it mostly results from want either of thought or of knowledge (or both) in the manner of expressing it; and the practical result of such a method of writing is that the composer, if he gets an opportunity of having his work played, will almost certainly hear it badly done. Our orchestral performers will take the trouble, if needful, to practise a difficult passage by Beethoven, Brahms, or Wagner; but they will not take the same trouble, unless absolutely compelled to do so, with a symphony by Smith or Jones; and in any case, they will play it not *con amore*, but probably with an accompaniment of "curses not loud, but deep." Any one who has had much intercourse with orchestral players will know the truth of this. From similar considerations of practicability the student should avoid the introduction into his scores of instruments not in most orchestras. If, for instance, he write an important part for a bass clarinet, or a contrafagotto, he is placing a considerable obstacle in the way of the production of his work.

225. We now come to another point closely connected with the last—the importance of *interesting the performers*. A judicious composer will always endeavour to give something of importance (even if it be only a few notes) to every instrument in the orchestra. If the second oboe, for instance, or the second clarinet has now and then in the course of the piece a passage in which his instrument comes for a moment into prominence, and he feels that he too is of importance to the general effect, he will blow away contentedly at whole pages of holding notes and accompaniments. Look at the scores of Mozart's operas, or Beethoven's symphonies,

from this point of view, and see how something at least is given to each player in the course of the work. If the performers be interested, they will play with a will; and attention to this matter on the part of the composer may probably make all the difference between a good and an indifferent performance of his work.

226. Another consideration of the very first importance is the necessity for *clearness* in orchestral writing. This point has been already alluded to in an earlier chapter (Sect. 178); but it is of such moment that it must be referred to again. Many young composers seem to treat their scores as if they were exercises in writing counterpoint in eight or nine real parts. Under certain circumstances such polyphony is allowable or even desirable; but in the large majority of cases an increase in the number of real parts (we are not speaking of mere doublings in the octave), far from adding to the general effect, only causes confusion. Sebastian Bach, indeed, understood how to combine any number of independent melodies without sacrificing clearness; but his case is altogether exceptional. Mozart, in the finale of his "Jupiter" Symphony has given some wonderful examples of polyphonic writing; but it requires the genius of a Mozart to construct such a movement; and in performance there are many points which do not sound so clear as they look in the score. On this point it may be remarked incidentally that in nearly every score passages will be noticed in reading which will scarcely be heard in actual performance, but which seem to be introduced partly for the sake of correct part-writing, and probably also in part for the sake of interesting the player. The greatest living contrapuntists are probably Brahms, Raff, and Wagner; but if their scores be examined, it will be found that the thickness and obscurity resulting from the introduction of too many independent parts are seldom to be noticed: the four-part harmony forms (as it always should) the foundation of the musical structure. It is impossible to lay down a hard and fast rule on this point; experience alone will teach the composer what to do and what to avoid; but perhaps it is not too much to say that as a general rule the clearness of effect will be in inverse proportion to the number of real parts above four employed.

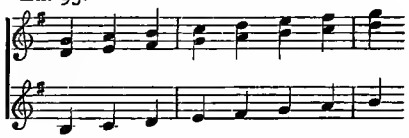
227. It is an important rule, though not always so carefully observed as it should be, that each group of instruments should make correct harmony by itself. It is perhaps superfluous to say that this does not apply to the natural horns and trumpets, to which, in consequence of their incomplete scale, many licenses are necessarily allowed in this matter.*

---

* See, for example, the eight bars of consecutive perfect fifths between the trumpet and ophicleide in the overture to the "Midsummer Night's Dream" (pp. 48, 49, of Breitkopf and Härtel's new edition).

A simple example will explain what we mean :—

Ex. 95.



In this sequence of sixths, the three parts may be given to strings alone, or to wind alone, or the three string parts may be doubled by three wind instruments—*e.g.*, an oboe playing with the first violin, and two clarinets with the second violin and viola ; it would even be possible, though of doubtful effect, to give the two extreme parts to strings and the middle part to wind, or *vice versâ*. But it would be incorrect to give the two upper parts to strings, and the lowest one to wind, or the upper parts to (let us say) two oboes, and the lowest to violins ; and if all three parts were played by strings, it would be wrong to double the two upper parts with wind instruments without also doubling the third.

228. The besetting sin of the modern school of orchestration is the love of noise ; and against this tendency the present is a suitable place to enter an earnest protest. Our age has been appropriately described from a musical point of view as "the age of brass." Two horns, two trumpets, and a pair of kettle-drums sufficed for many of the grandest inspirations of Mozart and Beethoven ; but our modern composers think nothing of introducing on every occasion, four horns, two or three trumpets, three trombones, an ophicleide or tuba, and (as likely as not), in addition to the kettle-drums, the big drum and cymbals, triangle, and sometimes also side-drum. And most, if not all, of these may be heard in some modern works in the accompaniment to a simple song! It is like using a Nasmyth steam-hammer to kill a fly. We are not protesting against the use, but against the *abuse*, of these instruments. Magnificent effects may be frequently obtained from the brass, as has been often proved by Schubert and Mendelssohn, and in our own day by Brahms and Wagner ; but it is none the less true that the prevalent tendency of the modern school is to employ this department of the orchestra far too frequently. The general tone-colour becomes richer, it is true, but it also soon becomes monotonous, and many of the more delicate orchestral tints are blurred and obscured by the constant superposition of horns and trombones.

229. It is probable that the general introduction of the ventil in brass instruments has done much to foster this tendency.

When composers had at their disposal only a limited number of notes for horns and trumpets, they were forced, whether they would or not, to employ them with moderation. But when the new mechanism gave them the complete chromatic scale for the brass, they in too many cases yielded to the temptation to use these instruments on all occasions, overlooking altogether the fact that in their limited scale lay a considerable part of the secret of their effectiveness. We strongly advise the student to use only the natural horns and trumpets, at least until he has acquired enough experience to know how to treat the valve instruments with discretion. In the whole of the extracts we have quoted in the course of this volume, we have purposely given only passages to be played on the natural instruments; * and it will be seen that there is in them quite sufficient variety for ordinary purposes.

230. It will be an excellent exercise for the student to compose frequently for a small orchestra without trumpets or drums. Until he has tried for himself he will hardly realise what an infinity of combinations is possible without having recourse to noise at all; and in proportion as he accustoms himself to the production of charming effects with a few instruments, he will be less tempted to that misuse of the brass of which we have been speaking.†

231. M. Gevaert, in his admirable "Traité d'Instrumentation," says:—

If we compare one of Mozart's operas with a modern dramatic work, we shall immediately notice a profound difference in the system of instrumentation. Here the composition of the orchestra is, so to speak, stereotyped, and, except for slight differences, it remains the same from one end of the score to the other. The effect of each movement taken separately is more brilliant, but the continual return of the same sonorousness engenders at last satiety and monotony.

With Mozart, on the contrary, the instrumental programme is only completely filled in the culminating situations of the drama, and this habitual sobriety brings out into stronger relief the irresistible vigour of the orchestra when all the masses are united.

232. Though M. Gevaert, in the above quotation, is speaking more especially of the instrumentation of the opera, his sound observations apply with hardly less truth to the modern school of orchestration in general. Meyerbeer, Gounod, and Wagner, brilliant and most interesting as their scores are, can hardly

* With the single exception of the chord from Wagner's "Meistersinger" in Ex. 78, which, however, could just as easily be played by two natural horns in F and two in C.

† As a most interesting example of what can be done, even in elaborate music, with a small orchestra, see the first finale of Cherubini's "Les Deux Journées." This magnificent piece occupies fifty-seven pages of the score, and is full of the most delightful effects of instrumentation; but the only wind instruments used are flutes, oboes, clarinets, bassoons, and two horns.

be recommended to the student as good models. Let him not disdain to learn from them the production of special effects and the management of large tone-masses when he requires such; but let him, if he would learn how to use every single instrument legitimately and to produce great effects by small means, consult the scores of Mozart, Gluck, Beethoven, Cherubini, and Schubert. It is at least an open question whether, with all our modern fulness and richness, the science of instrumentation has made much real progress since the scores of "Figaro," "Fidelio," and "Les Deux Journées" were written.

233. In concluding this work we emphatically repeat what we said in commencing—that instrumentation cannot be taught from an instruction-book. Those (if there be such) who may buy this Primer, expecting that when they have read it they will be able to write for the orchestra, will most assuredly be disappointed. All that has been possible has been to explain the *technique* of the various instruments, and to put the reader in the way of finding out for himself what to do with them. Natural aptitude, aided by study and experience, must do the rest: by seeing how the great masters have used the orchestra, the student will best learn how to use it himself. If the extracts given in this book assist him in this matter their object will be sufficiently answered

APPENDIX.

THE ORDER OF THE INSTRUMENTS IN A SCORE.

234. It is much to be regretted that no uniform method exists of arranging the instruments in a score. The consequence is that a musician in reading a strange work may be considerably inconvenienced at first by finding the instruments in a different relative position from that to which he is accustomed. This is more especially the case with older works; in modern scores only two, or at most three, methods of arranging the parts are in general use. As it will be impossible to indicate all the arrangements to be met with, a few words only will be said as to the systems generally employed.

235. The first of these places the three upper string-parts at the top of the score; next the wind—the wood according to their pitch, beginning with the flutes as the highest—then the horns, trumpets, and drums, the trombones (if they should be used) being placed immediately over, or sometimes under, the drums; and lastly, the violoncellos and basses. The whole score would, therefore, take this order:—

Strings.	Violino 1. Violino 2. Viola.
Wood.	Flauti. Oboi. Clarinetti. Fagotti.
Brass.	Corni. Trombe. (Tromboni).
	Timpani.*
	Violoncello e Basso.

* The drums are exceptionally placed at the foot of the score, under the double-basses, as in Méhul's "Joseph," Cherubini's "Elise," &c.

This arrangement is to be found in the old editions of many scores by Mozart and Haydn; it is also used by some modern composers, *e.g.*, Meyerbeer and Hérold. Spontini, in the score of "La Vestale," has introduced a variation in placing the viola immediately above the bass instead of below the violins, which seems to have no advantage, while it renders the score inconvenient to read.

236. A second system consists in grouping the instruments in their order of importance in the score—putting those least used at the top. This plan is followed in some German music, for instance, in Schumann's Symphony in E flat, where the parts stand thus:—

Timpani.
Trombe.
Corni.
Flauti.
Oboi.
Clarinetti.
Fagotti.
Tromboni.
Violino 1.
Violino 2.
Viola.
Bassi.

This plan has the advantage over the first of keeping all the strings together; but it is an anomaly that the trombones should be separated from the rest of the brass. The system is now, we believe, entirely disused.

237. The third and most usual method with modern music is to take the three groups, putting the members of each (with one exception) in their order of pitch, the wood first, then the brass and percussion, and lastly the strings. The exception just referred to is that of the horns. Though in pitch they are lower than the trumpets they are placed above them, because they are so often used with the wood that it is more convenient that they should be placed next to them. A variation of this method is used by some French composers (*e.g.*, Auber); it consists in arranging the whole of the wind in the order of pitch. By this plan, instead of having the wood and brass separate, these two departments of the orchestra are mixed. The third plan, with its variation, will be the following:—

Flauti.		
Oboi.		
Clarinetti.		
Fagotti.	(*Or*)	Trombe.
Corni.		Corni.
Trombe.		Fagotti.
Tromboni.		
Timpani.		
Violino 1.		
Violino 2.		
Viola.		
Bassi.		

238. When additional instruments are introduced in the score, they are put in their position according to their class and pitch. Thus the piccolo is put over the flute,* the cor anglais below the oboe, the tuba or ophicleide below the trombones; other percussion instruments below the kettle-drums. The harp is generally placed next above the violins; though it is sometimes found immediately above the basses, and in one score (that of Gade's "Crusaders") it is placed, most inconveniently, at the top of the page.

239. In vocal music the plan most generally adopted is to write the voice parts in the order of their pitch next above the basses. If there be both solo and chorus parts, the whole of the solo voices must be placed above the chorus, in their order of pitch; and in a double chorus the whole of the first chorus must be placed together above the second. Some composers place the voices above the first violins, thus dividing the wind and the strings; but the more usual method seems preferable. In concertos, the solo instrument is occasionally placed at the top of the page, but more frequently over the first violins, though it is sometimes (especially the piano) to be found between the violas and the basses.

240. Students are recommended in their scores to adopt the order last given, which it will be seen has been employed throughout this book, a rearrangement of the parts having been made where required. It is necessary that the learner should also be acquainted with the other methods of arranging the scores which have been given. If these are fairly mastered, no great trouble will be experienced in reading any score in which slight variations may be found.

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* Many composers place the piccolo *under* the flute; probably because it is generally played by the second flute-player. The upper stave is certainly its more appropriate place.

241. As the names of the notes differ in various languages, it will be well to give a complete table of all the names likely to be met with in Italian, French, or German scores, as the student may otherwise find himself in difficulties:—

English.	Italian.	French.	German.
C	Do	Ut	C
C flat	Do bemolle	Ut bémol	Ces
C sharp	Do diesis	Ut dièse	Cis
D	Re	Re	D
D flat	Re bemolle	Re bémol	Des
D sharp	Re diesis	Re dièse	Dis
E	Mi	Mi	E
E flat	Mi bemolle	Mi bémol	Es
E sharp	Mi diesis	Mi dièse	Eis
F	Fa	Fa	F
F flat	Fa bemolle	Fa bémol	Fes
F sharp	Fa diesis	Fa dièse	Fis
G	Sol	Sol	G
G flat	Sol bemolle	Sol bémol	Ges
G sharp	Sol diesis	Sol dièse	Gis
A	La	La	A
A flat	La bemolle	La bémol	As
A sharp	La diesis	La dièse	Ais
B	Si	Si	H
B flat	Si bemolle	Si bémol	B
B sharp	Si diesis	Si dièse	His

INDEX OF ILLUSTRATIONS

N.B.—The numbers refer to the examples, not to the pages.

AUBER.	Le Dieu et La Bayadère	47
	Le Domino Noir	23, 84
	Lestocq	42
	Masaniello	58, 78
	Sirène	72
BEETHOVEN.	Choral Symphony	39
	Concerto in C minor	91
	Concerto in E flat	22
	Fidelio	60
	Overture, Leonora (No. 1)	17
	Overture, Op. 115	78
	Prometheus	21
	Quartett, Op. 59 (No. 1)	9
BRAHMS.	Rinaldo	51
	Schicksalslied	64
	Symphony in C minor	76, 78
BRUCH.	Odysseus	73
CHERUBINI.	Elise	40
	Faniska	78
GADE.	Crusaders	7, 46
GLUCK.	Iphigénie en Tauride	83
GOUNOD.	Funeral March of a Marionette	82
HANDEL.	Saul	31
HAYDN.	Seasons	29, 36
	Symphony in D	14
	Symphony in G	52
	Symphony in G (Military)	71
MÉHUL.	Joseph	54
MENDELSSOHN.	Elijah	85
	Lobgesang	55, 87, 89
	Midsummer Night's Dream	24, 32, 44
	Overture, Hebrides	13
	Overture, Ruy Blas	78

MENDELSSOHN (*continued*)—	Psalm 98	90
	St. Paul	68
	Symphony in A (Italian)	56
	Symphony in A minor (Scotch)	50
	Symphony in C minor	19
	Violin Concerto	94
	Walpurgis Night	11
MEYERBEER.	Les Huguenots	78
	Robert le Diable	37, 80
MOZART.	Clemenza di Tito	75, 78
	Concerto in D minor	93
	Don Giovanni	15
	Symphony in D	41
	Symphony in E flat	53, 62
	Symphony in G minor	16
	Zauberflöte	61
ROSSINI.	Stabat Mater	25, 78
SCHUBERT.	Fierrabras	67
	Mass in F	81, 88
	Rosamunde	49
	Symphony in B minor	38
	Symphony in C	28, 78
SCHUMANN.	Concerto in A minor	92
	Paradise and the Peri	74
	Symphony in D minor	27
SPOHR.	Jessonda	20
WAGNER.	Faust Overture	69
	Lohengrin	26, 70
	Meistersinger	78
	Walküre	8, 12
WEBER.	Concertstück	63
	Freischütz	78
	Jubilee Cantata	43, 86
	Mass in G	30
	Oberon	4

HUMMEL.

	s.	d.
First Mass in B flat	1	0
Communion Service, ditto	2	0
Second Mass in E flat	1	0
Communion Service, ditto	2	0
Third Mass in D	1	0
Communion Service, ditto	2	0
Alma Virgo (Latin and English)	0	4
Quod in Orbe (ditto)	0	4

W. H. HUNT.

Stabat Mater	3	0

H. H. HUSS.

Ave Maria (Female Voices)	1	0

F. ILIFFE.

Sweet Echo	1	0

JOHN WILLIAM JACKSON.

I cried unto God	1	6

W. JACKSON.

The Year	2	0

D. JENKINS.

David and Saul (Sol-fa, 2s.)	3	0

A. JENSEN.

The Feast of Adonis	1	0

W. JOHNSON.

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